United States Department of Agriculture

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May 27, 2010

CALIFORNIA TECHNICAL GUIDE 450-VI

TECHNICAL GUIDE NOTICE NO. 103

SUBJECT: Section III - Issue new Conservation Activity Plan Technical Criteria

Section IV - Issue new and revised California Conservation Practice Standards and Specifications

Purposes:

1. To issue Conservation Activity Plan Technical criteria.
2. To issue new and revised California and California Interim conservation practice standards and specifications, new CNMP Conservation Activity Plan technical criteria, and update the Index of Conservation Practices

Effective Date: When contents are received.

Explanation:

Section III: The following Conservation Activity Plan (CAP) technical criteria are being issued:

Code	Practice/Activity Plan Name	Technical Criteria
102	Comprehensive Nutrient Management Plan	●
122	Agricultural Energy Management Plan	●

Conservation Activity Plans are a type of conservation plan focused on specific resource areas, such as confined animal operations. The technical criteria provide the technical requirements and deliverables for completing the Conservation Activity Plan.

Technical Criteria has been finalized for developing Comprehensive Nutrient Management Conservation Activity Plans (CNMP CAPs) and Agricultural Energy Management Plans (AgEMP CAPs) in California. These are posted in Section III of eFOTG.

Section IV: The following California Approved and California Interim conservation practice standards and specifications have been added or revised to Section IV of eFOTG:

Code	Practice Name	Std	Spec	PR	O&M	SOW
472	Access Control	•				•
314A	Brush Management – Juniper Control		•	•		
466	Land Smoothing			•		
484	Mulching	•	•	•		
798	Seasonal High Tunnel System for Crops (new national interim standard)	•	•	•		•
587	Structure for Water Control	•			•	•
587A	Structure for Water Control, Corrugated Metal Pipe		•	•		
587B	Structure for Water Control, Plastic Pipe Culverts		•	•		
587C	Structure for Water Control, Fish Screen		•	•	•	
587D	Structure for Water Control, Russian River Pilot		•	•	•	
659	Wetland Enhancement	•				

Access Control (Code 472) – Name of the Practice has changed from "Use Exclusion" to "Access Control". The Definition, Purpose, and Criteria have been expanded. Standard and Statement of Work issued.

Brush Management (Code 314A) – Added Specification and Practice Requirements for Juniper Control.

Land Smoothing (Code 466) – Added a Practice Requirement Sheet

Mulching (Code 484) – Incorporates new information on plastic mulches and research on weed suppression. Adds considerations when using urban sources of mulch material. Adds reduction of airborne particulates as a purpose. Adds use of Soil Conditioning Index to evaluate soil quality benefits of mulch. Requires nutrient certification and organic certification for mulches used for building soil fertility in organic systems.

Structure for Water Control (Code 587) – Structure for Water Control, Russian River Pilot has been developed to address resource concerns in the Russian River Watershed. This is applicable only in Sonoma and Mendocino Counties. All other documents have had the date revised as this has been released in Technical 150 with a date change only.

Seasonal High Tunnel System for Crops (Code 798) – New interim practice standard established at the national level. California is participating in the 3-year pilot program to evaluate this practice for conservation benefits. The primary purpose of the practice is to extend the growing season.

Wetland Enhancement (Code 659) - Under the definition, language was added to create consistency with the National Standard. This language specifies that enhancement activities will "augment specific site conditions for specific species or purposes; possibly at the expense of other functions and other species."

The California eFOTG, located on the web at http://www.nrcs.usda.gov/technical/efotg/ and in my.nrcs at https://my.nrcs.usda.gov/default.aspx, is being updated to reflect these changes to Sections III and IV.

Optional Filing Instructions (for copies of FOTG maintained in Field Offices)

Replace the "Index of Conservation Practice Standards and Specifications Index – Alphabetical Index" contents, pages 1-12, dated November 30, 2009, with the new "Index of Conservation Practice Standards and Specifications Index – Alphabetical Index" contents, pages 1-12, dated May 27, 2010.

Replace "Index of Conservation Practice Standards and Specifications Index – Numerical Index" contents, pages 1-12, dated November 30, 2009, with the new "Index of Conservation Practice Standards and Specifications Index – Numerical Index" contents, pages 1-12, dated May 27, 2010.

Remove the old practice standards, specifications, practice requirements, and Statements of Work and insert the new practice standards and documents issued above in Section IV. Insert the new CNMP CAP and AgEMP CAP Technical Criteria in Section III.

Terryl Korsis, acting

for
DIANE B. HOLCOMB
State Resource Conservationist

ATTACHMENTS: (electronic) (Copies will be posted to the California eFOTG.)

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Log of California Technical Guide Notices

Tech Guide Notice Number	Date of Notice	Subject	Date Entered	Initials
1	8/30/94	Revised Sections I through V and Updates to Section V	9/14/94	WAB
2	3/30/95	Section II- Issue Ecological Site Descriptions for parts of MLRAs 22,26,29, and 30	5/9/95	JR
3	6/6/95	Section IV – Issue Practice Standard 201: Irrigation Erosion Control (Polyacrylamide PAM)	8/3/95	WAB
4	8/4/95	Section IV- Issue set of Practice Narratives available in FOCS	8/11/95	WAB
5	8/11/95	Section II- Issue FOCS Soils Database Certification for Monterey County and Imperial Valley Area Soil Surveys (SSA #s 053 and 683)	8/11/95	CHP
6	9/21/95	Section II- Transmit Statewide Important and Prime Farmland Lists for Malibu Area	9/21/95	DR+TB
7	10/16/95	Section IV- Transmit New and Revised Conservation Practice Standards and Specifications	10/16/95	TSB
8	10/25/95	Section II- Issue FOCS Soils Database Certification for Sutter County Soil Survey (SSA # 101)	10/25/95	CHP
9	12/14/95	Section IV- Transmit Revised Conservation Practice Standards and Specifications	12/27/95	TSB
10	12/27/95	Section III- Transmit RMS Guidance Documents	12/27/95	TSB
11	1/29/96	Section III- Transmit new Management System Templates	1/31/96	TSB
12	2/27/96	Section III- Transmit new RMS Guidance Documents and Management System Templates	2/27/96	WAB
13	7/30/96	Section III- Transmit updated Introduction pages for each land use	9/10/96	WAB

Tech Guide Notice Number	Date of Notice	Subject	Date Entered	Initials
		subsection in the Guidance Documents Resource Management Systems section		
14	8/1/96	Section IV- Transmit Revised Conservation Practice Standards and Specifications	9/10/96	WAB
15	10/7/96	Section II- Transmit Soil-Pesticide Loss Potentials for California Soil Survey areas	10/31/96	GS+WAB
16	12/12/96	Section II- Transmit Prime and Statewide Important Farmland Lists for Sutter County Soil Survey (SSA #101)	12/12/96	KP
17	1/7/97	Section II- Transmit publication: Field Indicators of Hydric Soils in the United States	1/7/97	GS
18	2/7/97	Section II- Transmit Hydric, HEL, and Prime Farmland and Statewide Important Farmland Lists for Edwards Air Force Base	2/7/97	GS
19	7/2/97	Section II- Transmit PM-10 Ratings for Edwards Air Force Base	7/2/97	SBS
20	5/8/97	Section II- Transmit Soil-Pesticide Loss Potentials for soil mapping units in the East Stanislaus Area and the Stanislaus County, Western Part Soil Survey Areas	5/8/97	GS
21	7/17/97	Section II- Transmit Prime and Statewide Important Farmland Lists for San Bernardino County, Mojave River Area (SSA # 671)	7/17/97	KP
22	8/8/97	Section II- Transmit Prime and Statewide Important Farmland Lists for Mendocino County, Western Part and Mendocino County, Eastern Part and Southwest Part of Trinity County Soil Survey Areas (SSA #s 694 and 687)	8/8/97	KP
		Section I- Transmit Component Cost List for the Wetland Reserve Program, PL-566 Land Treatment Program, and		

Tech Guide Notice Number	Date of Notice	Subject	Date Entered	Initials
23	8/27/97	Forestry Incentives Program	8/27/97	MMR
24	10/7/97	Section II- Transmit Wind Erosion Soils Lists for Organic and Volcanic soils for the upcoming 16th CRP sign-up period	10/9/97	GS
25	12/4/97	Section I- Transmit Component Cost List for the Wildlife Habitat Incentives Program (WHIP) and the Wetland Reserve Program	12/4/97	RS
26	1/21/98	Section I- Transmit USDA publication R5-EM-TP-005: "Ecological Subregions of California - Section and Subsection Descriptions" and 1994 map: "Ecological Units of California"	1/21/98	GS
27	2/23/98	Section II- Transmit Hydric Soil Tech. Note #2	2/23/98	GS
28	3/--/98	Section II- Transmit Revised Hydric Soil Tech. Note #2	3/--/98	GS
29	9/24/98	Section II- Remove Arrondo donax from the Vegetative Guide	9/28/98	TB
30	1/7/99	Section II- Transmit 26 "Soils Data for Conservation Planning" tables	1/7/99	WAB
31	12/4/98	Section II- Remove 15 plants from the Vegetative Guide	3/5/99	TB
32	12/8/98	Section I- Transmit booklet on Estimating Annual Grass Residue: "Residual Dry Matter (RDM) Monitoring Photo-Guide"	3/5/99	TB
33	1/7/99	Section II- Transmit 24 "Soils Data for Conservation Planning" tables	1/7/99	WAB
34	1/7/99	Section II- Transmit 28 "Soils Data for Conservation Planning" tables	1/7/99	WAB

Tech Guide Notice Number	Date of Notice	Subject	Date Entered	Initials
35	1/14/99	Section I- Confirm distribution of 8 new maps for RUSLE predictions	1/14/99	WAB
36	3/11/99	Section II- Transmit revised Soil-Pesticide Loss Potentials for California Soil Survey Areas	3/11/99	GS
37	4/12/99	Section II- Replaced the vegetative guide with updated copies	4/8/99	GB
38	9/30/99	Section II- Distribute the revised Vegetative Guide for MLRA 17	9/30/99	WAB
39	3/31/00	Section IV- Transmit revised Conservation Practice Standard and Specification for Dikes, Practice Code 356	4/25/00	TB
40	5/10/00	Section I- Transmit the CORE4 Conservation Practices Workbook (hard copy and CD version)	5/26/00	TB
41	4/24/00	Section II- Transmit Prime and Statewide Important Farmland Soils Lists for Chemehuevi and Fort Mojave Indian Reservations	5/26/00	TB
42	6/28/00	Section V- Provide Guidance on where to file the “Grazing For Change” publication	10/26/00	DH
43	9/29/00	Issue Revised/Updated Field Office Technical Guide	10/26/00	GLB
44	10/26/00	CDF Vegetation Mgmt Program Acres Burned	6/13/02 6/20/00	W. Bunter L. Jolley
45	10/25/00	Issue Reference: Low Maintenance Roads for Ranch, Fire & Utility Access	8/15/02	W. Bunter
46	2/27/01	Prime and Statewide Important Farmland Lists – Stanislaus County West Part	2/27/01	GS

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47	2/27/01	Prime and Statewide Important Farmland Lists-Colusa County, CA	2/27/01	GS
48	4/23/01	Valleys of the Plumas Land Capability & Storie Index Ratings	4/23/01	GS
49	8/22/01	Yolo County Hydric Soils List	8/22/01	GS
50	8/22/01	Prime and Statewide Important Farmland List – Tulare Central	8/22/01	GS
51	2/20/02	MLRA 17 Seeding Mixtures for 4Eta Zones d and e	2/28/02	ARF
52	3/19/02	Issue New Ecological Site Descriptions for MLRAs 29 & 30	8/8/02 3/19/02	W. Bunter DBH
53	5/1/02	Issue Revised Dike Standard	6/13/02 5/1/02	W. Bunter M. Hallet
54	10/7/02	Issue Revised Conservation Standards and Specifications	10/7/02	DBH
55	2/21/03	Issue Revised Conservation Standards and Specifications	2/21/03	DBH
56	3/31/03	Revised Yolo Hydric Soils List – SSURGO-2	3/31/03	GS
57	5/1/03	Component Cost List (issued via bulletin)	5/1/03	M. Parson
58	8/15/03	Resource Quality Criteria Revised	8/15/03	DBH
59	11/6/03	Issue Revised Conservation Standards and Specifications	11/6/03	MKH

Tech Guide Notice Number	Date of Notice	Subject	Date Entered	Initials
60	10/21/03	Issue IPM References	10/21/03	R. Fry
61	11/24/03	Issue Revised 442A Spec and Construction Requirement Sheet	11/24/03	DJ
62	3/10/04	Distribute "Atlas of Biodiversity of California"	3/10/04	DAB
63	3/31/04	Issue Revised Conservation Practice Standards and Specs	3/31/04	MKH
64	4/15/04	Distribute "Stone Age Spear and Arrow Points of California and Great Basin"	4/1/04	FD
65	4/15/04	Distribute "Handbook of North American Indians"	4/15/04	DAB
66	6/4/04	Distribute "California Archaeology"	6/4/04	FD
67	9/1/04	Issue Revised Conservation Practice Standards and Specifications	9/1/04	MKH
68	8/23/04	Issue "Low-Volume Roads Engineering BMP Field Guide"	8/20/04	JKG (J. Grim)
69	9/7/04	New Price Indices	9/7/04	DAB
70	10/1/04	Distribute "Recycling Municipal Trees" reference	10/1/04	J. Reioux
71	11/16/04	Issue Revised Conservation Practice Standards and Specifications	11/26/04	MKH
72	11/30/04	Issue Revised Conservation Practice Standards and Specifications – 595 Pest Management	11/30/04	DBH
73	6/16/05	Distribute "Pollinator Conservation Handbook"	5/18/05	DAB
74	8/19/05	Issue Revised Conservation Practice Standards and Specifications	8/25/05	MKH

Tech Guide Notice Number	Date of Notice	Subject	Date Entered	Initials
75	7/8/05	Issue Second Edition of "Know Your Natives" publication	7/21/05	RB (Rita)
76	7/8/05	Issue CA Amendment to Natl Agronomy Manual – technical information on tillage implements	7/21/05	RB (Rita)
77	9/23/05	Update Section IV – Delete CA Interim Practice Standards, Issue/Revise 629, 632, 596/702 and 378	9/8/05	Walt Bunter
78	12/30/05	Issue new Atmospheric Resources Quality Management Practice Standard, Specs and PR Sheet (370), delete and archive Air Management Standard (705)	12/01/05	Walt Bunter
79	1/23/06	Issue revised Conservation Practice Standards and Specifications	1/18/06	MKH, CJ
80		Cancelled – issued with TG Notice No. 85		TM, CJ
81	2/27/06	Issue new HEL lists for Butte County	2/27/06	GS
82	5/22/06	Issue Corrected NHEL Exclusion Zone Map for Yuba County, California	5/26/06	GS
83	5/26/06	Issue New and Revised Practice Standards	5/26/06	MKH
84	6/30/06	Issue Revised Practice Standards	6/30/06	JG, WB
85	8/28/06	Issue New and Revised Practice Standards	8/28/06	MKH
86	4/3/07	Issue New and Revised Practice Standards	10/31/06	MKH
87	4/12/07	Section II – Release of California	4/12/07	DH

Tech Guide Notice Number	Date of Notice	Subject	Date Entered	Initials
		eVegGuide		
88	5/31/07	Section II – Revised Prime and Other Important Farmlands list for CA604 – Intermountain Area, Parts of Lassen, Modoc, Shasta, and Siskiyou Counties, California.	6/11/07	GS
89	5/31/07	Section II – Revised Hydric Soils List for CA604 – Intermountain Area, Parts of Lassen, Modoc, Shasta, and Siskiyou Counties, California.	6/11/07	GS
90	7/16/07	Revised HEL (Highly Erodible Land) List, Fresno County, Western Part, California	8/1/07	GS
91	7/16/07	Revised HEL (Highly Erodible Land) List, Tulare County, Western Part, California	8/1/07	GS
92	7/16/07	Revised HEL (Highly Erodible Land) List, Kern County, Northeast Part, California and Eastern Part of Tulare County (CA668)	8/1/07	GS
93	9/11/07	Updated Resource Concerns and Resource Quality Criteria for California and supporting planning tools	8/27/07	PL
94	9/14/07	Issue New and Revised Conservation Practice Standards and Specifications	8/25/07	MKH
95	2/14/08	Issue New Conservation Practice Physical Effects database	2/14/08	DBH
96	2/19/08	HEL List for CA011 Colusa County, California	2/19/08	GS
97	6/4/08	Issue eVegGuide Updates – MLRAs 19,	6/4/08	RB

Tech Guide Notice Number	Date of Notice	Subject	Date Entered	Initials
		20, 30, and 31		
98	6/30/08	Section IV - Issue New and Revised Conservation Practice Standards and Specifications	6/19/08	WB
99	5/4/2009	Section IV – Issue Revised Conservation Practice Standards	5/4/09	MH, DBH
100	7/2/2009	Section III – Issue Conservation Activity Plan Technical Criteria Section IV – Issue Revised Conservation Practice Standards and Specifications	7/2/09	MH, DBH
101	11/30/2009	Section IV – Issue Revised Conservation Practice Standards and Specifications	11/30/2009	MH, DBH
102	12/28/2009	Section I – Update County Data Tables for FPPA Form AD-1006	12/28/2009	MH, DBH
103	5/27/2010	Section III – Issue Conservation Activity Plan Technical Criteria Section IV – Issue Revised and New Conservation Practice Standards and Specifications	5/27/2010	MH, DBH TNK

INDEX OF CONSERVATION PRACTICE STANDARDS AND SPECIFICATIONS
(Listed in Alphabetical Order by Practice Name)

CODE	PRACTICE NAME	Responsible Discipline(s)	CA Standard	DATE OF CURRENT: CA Specif-ication	Material Specifi-cation	Practice Require-ments	Operation & Main-tenance	Statement of Work
431	Above Ground, Multi-Outlet Pipeline	ENG	9/07	11/09	-----	9/07	11/09	9/07
472	Access Control	RANGE	5/10	------	------	------	------	5/10
560	Access Road	ENG	9/04	11/09	------	9/04	11/09	8/04
309	Agrichemical Handling Facility	ENG	6/08	2/	------	6/08	11/09	6/08
311	Alley Cropping	FOR	10/02	3/	------	------	------	8/04
591	Amendments for Treatment of Agricultural Waste	ENG	8/06	2/	------	------	------	8/06
365	Anaerobic Digester, Ambient Temperature	ENG	9/04	2/	------	------	------	7/05
366	Anaerobic Digester, Controlled Temperature	ENG	9/04	2/	------	------	------	7/05
316	Animal Mortality Facility	ENG	3/04	2/	------	3/04	------	8/04
575	Animal Trails and Walkways	ENG-RANGE	10/03	11/09	------	10/03	11/09	8/04
450	Anionic Polyacrylamide (PAM) Erosion Control	ENG	10/02	11/09	------	10/02	11/09	8/04
397	Aquaculture Ponds	BIO-ENG	3/04	2/	------	------	11/09	8/04
370E	Atmospheric Resource Quality Management, Ammonia Loss Reduction	AIR QUALITY	------	12/05	------	12/05	------	------
370A	Atmospheric Resource Quality Management, Dust/Particulate Matter	AIR QUALITY	------	12/05	------	------	------	------
370A1	Atmospheric Resource Quality Management, Dust/Particulate Matter – Unpaved Roads/Equipment Yards	AIR QUALITY	------	------	------	12/05	------	------
370A2	Atmospheric Resource Quality Management, Dust/Particulate Matter - On-Field Cultivation/Harvesting Activities	AIR QUALITY	------	------	------	12/05	------	------
370A3	Atmospheric Resource Quality Management, Dust/Particulate Matter - Confined Animal Feeding Operations (CAFO)	AIR QUALITY	------	------	------	12/05	------	------
370D	Atmospheric Resource Quality Management, Greenhouse Gases	AIR QUALITY	------	12/05	------	12/05	------	------

1/ California Interim Practice (Copy located in eFOTG Section IVC – Conservation Practices – CA Interim)
2/ A Practice Specification has not been prepared. Specifications and design details will be prepared upon request of the Area Engineer or State Conservation Engineer
3/ A Practice Specification has not been prepared. Specifications and design details will be prepared upon request of the State Staff Forester
4/ A Practice Specification has not been prepared. Specifications and design details will be prepared upon request of the Area Biologist or State Biologist
5/ A Practice Specification has not been prepared. Specifications and design details will be prepared upon request of the State Agronomist or State Conservation Agronomist
6/ A Practice Specification has not been prepared. Specifications and design details will be prepared upon request of the State Air Quality Specialist

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CODE	PRACTICE NAME	Responsible Discipline(s)	CA Standard	DATE OF CURRENT: CA Specif-ication	Material Specifi-cation	Practice Require-ments	Operation & Main-tenance	Statement of Work
370C	Atmospheric Resource Quality Management, Odor	AIR QUALITY	------	12/05	------	12/05	------	------
370F	Atmospheric Resource Quality Management, Ozone	AIR QUALITY	------	12/05	------	------	------	------
370F2	Atmospheric Resource Quality Management, Ozone – Volatile Organic Compounds – Pesticides	AIR QUALITY	------	------	------	12/05	------	------
370F3	Atmospheric Resource Quality Management, Ozone – Volatile Organic Compounds – Livestock Waste Management	AIR QUALITY	------	------	------	12/05	------	------
370F1	Atmospheric Resource Quality Management, Ozone (NOx) - Engines	AIR QUALITY	------	------	------	12/05	------	------
370B	Atmospheric Resource Quality Management, Smoke Reduction-Field Crops/Orchard/Vineyard	AIR QUALITY	------	12/05	------	12/05	------	------
370	Atmospheric Resource Quality Management	AIR QUALITY	12/05	------	------	------	------	12/05
310	Bedding	ENG	3/04	2/	------	------	11/09	8/04
314	Brush Management	RANGE	4/07	10/02	------	7/00	------	8/04
314A	Brush Management – Juniper Control	RANGE	------	5/10	------	5/10	------	------
322	Channel Bank Vegetation	AGRON	4/07	7/00	------	7/00	------	8/04
584	Channel Stabilization	ENG	10/03	11/09	------	10/03	11/09	8/04
326	Clearing and Snagging	ENG	10/03	11/09	------	10/03	11/09	8/04
360	Closure of Waste Impoundments	ENG	8/06	2/	------	------	11/09	8/04
723	Combustion System Air Emissions Management 1/	AIR QUALITY	5/09	-----	-----	-----	6/08	6/08
317	Composting Facility	ENG-AGRON	9/04	2/	------	------	11/09	8/04
327	Conservation Cover	AGRON-BIO	9/07	7/00	------	7/00	------	8/04
328	Conservation Crop Rotation	AGRON	10/02	7/00	------	7/00	------	8/04
656	Constructed Wetland	ENG-BIO	6/08	2/	------	------	11/09	8/04

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				----------DATE OF CURRENT----------				
CODE	PRACTICE NAME	Responsible Discipline(s)	CA Standard	CA Specif-ication	Material Specifi-cation	Practice Require-ments	Operation & Main-tenance	Statement of Work
332	Contour Buffer Strips	AGRON	7/00	5/	------	------	------	8/04
330	Contour Farming	AGRON	10/02	7/00	------	7/00	------	8/04
331	Contour Orchard and Other Fruit Area	AGRON	4/07	7/00	------	------	------	8/04
340	Cover Crop	AGRON	4/07	9/07	------	6/08	------	8/04
342	Critical Area Planting	AGRON-BIO	4/07	------	------	------	------	8/04
342F	Critical Area Planting, Bermudagrass	AGRON-BIO	------	7/00	------	7/00	------	------
342H	Critical Area Planting, Container Plants	AGRON-BIO	------	7/00	------	7/00	------	------
342I	Critical Area Planting, Dune Stabilization	AGRON-BIO	------	7/00	------	7/00	------	------
342E	Critical Area Planting, Erosion Control Blanket	AGRON-BIO	------	7/00	------	7/00	------	------
342B	Critical Area Planting, Hydro- Mulch	AGRON-BIO	------	7/00	------	7/00	------	------
342C	Critical Area Planting, Split Hydro-Mulch	AGRON-BIO	------	7/00	------	7/00	------	------
342A	Critical Area Planting, Straw Mulch	AGRON-BIO	------	7/00	------	7/00	------	------
342D	Critical Area Planting, Tackified Straw	AGRON-BIO	------	7/00	------	7/00	------	------
342G	Critical Area Planting, Woody Cuttings	AGRON-BIO	------	7/00	------	7/00	------	------
589A	Cross Wind Ridges	AGRON	4/07	7/00	------	7/00	------	8/04
589C	Cross Wind Trap Strips	AGRON	4/07	7/00	------	7/00	------	8/04
402	Dam	ENG	10/03	2/	------	10/03	11/09	7/05
348	Dam, Diversion	ENG	10/02	11/09	------	10/02	11/09	8/04
324	Deep Tillage	AGRON	10/02	5/	------	------	------	8/04
356	Dike	ENG	6/08	11/09	------	10/03	11/09	8/04
362	Diversion	ENG	10/02	11/09	------	10/02	11/09	8/04
554	Drainage Water Management	ENG	10/02	2/	------	------	11/09	7/05
432	Dry Hydrant	ENG	7/00	2/	------	------	11/09	8/04

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CODE	PRACTICE NAME	Responsible Discipline(s)	CA Standard	DATE OF CURRENT: CA Specif-ication	Material Specifi-cation	Practice Require-ments	Operation & Main-tenance	Statement of Work
729	Dust Control on Unpaved Roads and Surfaces 1/	AIR QUALITY	9/07	6/08	------	6/08	------	------
647	Early Successional Habitat Development/Management	BIO	4/07	4/	------	-----	------	8/04
592	Feed Management	AGRON-RANGE	4/07	5/	-----	------	-----	4/07
382	Fence	RANGE	4/07	------	------	------	------	8/04
382C	Fence, Electrical	RANGE	------	7/00	------	7/00	------	------
382B	Fence, Suspension	RANGE	------	7/00	------	7/00	------	------
382A	Fence, Standard	RANGE	------	7/00	------	7/00	------	------
386	Field Border	AGRON-ENG	9/07	11/09	------	9/04	------	8/04
393	Filter Strip	ENG-AGRON	8/06	2/	------	------	11/09	8/04
394	Firebreak	FOR	4/07	------	------	------	------	4/07
394B	Firebreak, Fuel-Break	FOR	------	7/00	------	10/02	------	------
394A	Firebreak, Standard	FOR	------	10/02	------	10/02	------	------
396	Fish Passage	BIO-ENG	4/07	2/	------	------	11/09	7/05
398	Fish Raceway or Tank	BIO-ENG	9/04	2/	------	------	11/09	7/05
399	Fishpond Management	BIO	4/07	4/	------	------	------	8/04
511	Forage Harvest Management	AGRON-RANGE	4/07	5/	------	------	------	8/04
384	Forest Slash Treatment	FOR	6/08	3/	-----	------	-----	-----
666	Forest Stand Improvement	FOR	6/08	------	------	------	------	8/04
666C	Forest Stand Improvement, Aspen/Cottonwood/Other	FOR	------	10/02	------	10/02	------	------
666A	Forest Stand Improvement, Coastal Douglas Fir/Redwood	FOR	------	10/02	------	10/02	------	------
666D	Forest Stand Improvement, Competing Vegetation Control	FOR	------	10/02	------	10/02	------	------

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CODE	PRACTICE NAME	Responsible Discipline(s)	CA Standard	DATE OF CURRENT: CA Specif-ication	Material Specifi-cation	Practice Require-ments	Operation & Main-tenance	Statement of Work
666B	Forest Stand Improvement, Ponderosa Pine/Jeffrey Pine/Sierra Nevada Mixed Conifer	FOR	------	10/02	------	7/00	------	------
655	Forest Trails and Landings	FOR	6/08	10/02	------	10/02	------	8/04
383	Fuel Break	FOR	4/07	3/	-----	------	-----	4/07
410	Grade Stabilization Structure	ENG	7/00	11/09	------	7/00	11/09	8/04
410A	Grade Stabilization Structure, Rock Drops	ENG	------	11/09	------	7/00	------	------
412	Grassed Waterway	AGRON-ENG	11/09	11/09	------	11/09	11/09	11/09
548	Grazing Land Mechanical Treatment	RANGE	4/07	7/00	------	7/00	------	8/04
561	Heavy Use Area Protection	ENG	5/09	2/	------	------	11/09	8/04
561A	Heavy Use Area Protection – Coal Ash Soil Surfacing	ENG	------	6/09	------	------	------	------
422	Hedgerow Planting	BIO	4/07	7/00	------	7/00	------	7/05
603	Herbaceous Wind Barriers	FOR	4/07	10/02	------	10/02	------	4/07
423	Hillside Ditch	ENG	11/09	2/	------	------	11/09	11/09
320	Irrigation Canal or Lateral	ENG	3/04	11/09	------	3/04	11/09	8/04
388	Irrigation Field Ditch	ENG	3/04	11/09	------	3/04	11/09	8/04
464	Irrigation Land Leveling	ENG	10/02	11/09	------	10/02	11/09	8/04
552	Irrigation Regulating Reservoir	ENG	10/03	2/	------	------	11/09	8/04
436	Irrigation Storage Reservoir	ENG	10/03	2/	------	------	11/09	8/04
441	Irrigation System, Microirrigation	ENG	9/07	11/09	------	10/02	11/09	9/07
442	Irrigation System, Sprinkler	ENG	6/09	11/09	------	8/06	11/09	8/04
442A	Irrigation System, Sprinkler, Above Ground Mainlines and Laterals	ENG	------	11/09	------	9/04	------	------
443	Irrigation System, Surface and Subsurface	ENG	3/04	11/09	------	3/04	11/09	8/04
447	Irrigation System, Tailwater Recovery	ENG	10/02	11/09	------	10/02	11/09	8/04
430AA	Irrigation Water Conveyance, Aluminum Tubing Pipeline	ENG	7/00	2/	------	------	11/09	8/04

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428A	Irrigation Water Conveyance, Ditch & Canal Lining, Plain Concrete	ENG	3/04	11/09	------	3/04	11/09	8/04
428B	Irrigation Water Conveyance, Ditch and Canal Lining, Flexible Membrane	ENG	12/04	2/	------	------	11/09	7/05
428C	Irrigation Water Conveyance, Ditch and Canal Lining, galvanized steel	ENG	3/04	2/	------	------	11/09	8/04
430DD	Irrigation Water Conveyance, High-pressure, Underground, Plastic Pipeline	ENG	7/00	11/09	7/00	7/00	11/09	8/04
430EE	Irrigation Water Conveyance, Low-pressure, Underground, Plastic Pipeline	ENG	7/00	11/09	7/00	7/00	11/09	8/04
430CC	Irrigation Water Conveyance, Non-reinforced Concrete Pipeline	ENG	7/00	11/09	------	7/00	11/09	8/04
430GG	Irrigation Water Conveyance, Reinforced Plastic Mortar Pipeline	ENG	7/00	11/09	7/00	7/00	11/09	8/04
430FF	Irrigation Water Conveyance, Steel Pipeline	ENG	10/02	11/09	------	10/02	11/09	8/04
449	Irrigation Water Management	ENG	4/07	11/09	------	7/00	------	4/07
460	Land Clearing	ENG	9/04	2/	------	------	------	8/04
453	Land Reclamation, Landslide Treatment	ENG	7/05	2/	------	------	11/09	7/05
455	Land Reclamation, Toxic Discharge Control	ENG	8/06	2/	------	------	11/09	8/04
543	Land Reconstruction, Abandoned Mined Land	AGRON-ENG	9/07	2/	------	------	11/09	9/07
544	Land Reconstruction, Currently Mined Land	AGRON-ENG	9/07	2/	------	------	11/09	9/07
466	Land Smoothing	ENG	10/03	2/	------	5/10	11/09	8/04
468	Lined Waterway or Outlet	ENG	6/06	11/09	------	10/03	11/09	8/04
634	Manure Transfer	ENG	7/05	2/	------	8/06	11/09	8/04
457	Mine Shaft and Adit Closing	ENG	7/05	2/	------	------	11/09	7/05
482	Mole Drain	ENG	3/04	2/	------	------	------	8/04

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353	Monitoring Well	ENG	9/04	2/	------	------	11/09	8/04
484	Mulching	AGRON	5/10	5/10	------	5/10	------	8/04
590	Nutrient Management	AGRON-ENG	9/07	6/08	------	6/08	------	8/04
500	Obstruction Removal	ENG	10/02	2/	------	------	------	8/04
582	Open Channel	ENG	7/00	2/	------	------	11/09	8/04
512	Pasture and Hay Planting	AGRON	4/07	7/00	------	7/00	------	4/07
595	Pest Management	AGRON	9/07	10/04	------	9/07	------	8/04
516	Pipeline	ENG	5/09	11/09	------	10/02	11/09	8/04
378	Pond	ENG	8/06	11/09	------	10/03	11/09	8/04
521C	Pond Sealing or Lining, Bentonite Sealant	ENG	10/02	11/09	------	10/02	11/09	8/04
521D	Pond Sealing or Lining, Compacted Clay Treatment	ENG	8/06	11/09	------	4/07	11/09	8/06
521A	Pond Sealing or Lining, Flexible Membrane	ENG	4/07	11/09	------	4/07	11/09	8/04
740	Pond Sealing or Lining, Soil Cement 1/	ENG	6/08	11/09	------	6/08	11/09	1/06
521B	Pond Sealing or Lining, Soil Dispersant	ENG	10/02	11/09	------	10/03	11/09	8/04
718	Precision Pest Control Application 1/	AIR QUALITY	5/09	6/08	------		6/08	6/08
718	Precision Pest Control Application - Ozone 1/			6/08	------	6/08		
462	Precision Land Forming	ENG	10/03	2/	------	------	------	8/04
338	Prescribed Burning	FOR	6/08	10/02	------	10/02	------	8/04
528	Prescribed Grazing	RANGE-AGRON	6/08	------	------	------	------	6/08
528A	Prescribed Grazing, Annual Rangeland	RANGE-AGRON	------	4/07	------	4/07	------	------
528B	Prescribed Grazing, Irrigated Pasture	RANGE-AGRON	------	4/07	------	4/07	------	------

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528C	Prescribed Grazing, Perennial Rangeland	RANGE-AGRON	------	4/07	------	4/07	------	------
528D	Prescribed Grazing, Wetlands	RANGE-AGRON-BIO	------	4/07	------	4/07	------	------
528E	Prescribed Grazing, Woodland/Forestland	RANGE-FOR	------	7/00	------	7/00	------	------
533	Pumping Plant	ENG	10/03	------	------	------	11/09	8/04
533A	Pumping Plant For Water Control, Air Quality – Emissions Reduction	ENG	------	10/02	------	10/02	------	------
550	Range Planting	RANGE	9/07	7/00	------	6/08	------	8/04
550A	Range Planting – Annual Plant Species	RANGE	------	6/08	------	------	------	------
550B	Range Planting – Perennial Plant Species	RANGE	------	6/08	------	------	------	------
562	Recreation Area Improvement	FOR	10/02	10/02	------	10/02	------	8/04
566	Recreation Land Grading and Shaping	ENG	10/02	2/	------	------	11/09	8/04
568	Recreation Trail and Walkway	ENG	10/02	2/	------	------	11/09	8/04
345	Residue and Tillage Management, Mulch Till	AGRON	4/07	6/08	-----	6/08	-----	4/07
329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	AGRON	9/07	6/08	------	6/08	------	6/08
346	Residue and Tillage Management, Ridge Till	AGRON	4/07	6/08	-----	6/08	-----	4/07
344	Residue Management, Seasonal	AGRON	4/07	7/00	------	7/00	------	4/07
344A	Residue Management, Seasonal, Rice Residue	AGRON	------	7/00	------	7/00	------	------
643	Restoration and Management of Rare or Declining Habitats	BIO	4/07	4/	------	------	------	-----
391	Riparian Forest Buffer	FOR	8/06	8/06	------	8/06	------	8/04
390	Riparian Herbaceous Cover	BIO	4/07	4/	------	8/06	------	8/04

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654	Road/Trail/Landing Closure and Treatment	ENG	6/09	6/09	------	6/09	6/09	6/09
555	Rock Barrier	ENG	10/03	2/	------	------	11/09	8/04
558	Roof Runoff Structure	ENG	10/02	2/	------	------	11/09	8/04
557	Row Arrangement	ENG	10/03	2/	------	------	------	8/04
570	Runoff Management System	ENG	10/02	2/	------	------	11/09	8/04
610	Salinity and Sodic Soil Management	ENG-AGRON	8/06	------	------	------	------	8/06
610 A	Salinity and Sodic Soil Management, Irrigated Lands	ENG-AGRON	------	11/09	------	8/06	------	------
798	Seasonal High Tunnel System for Crops (Interim Standard)	AGRON-ENG	5/10	5/10	------	5/10	------	5/10
350	Sediment Basin	ENG	9/04	2/	------	------	11/09	8/04
646	Shallow Water Development and Management	BIO	4/07	4/	------	------	------	-----
632	Solid/Liquid Waste Separation Facility	ENG	6/09	2/	------	------	11/09	8/06
572	Spoil Spreading	ENG	9/04	2/	------	------	------	8/04
574	Spring Development	ENG	9/07	11/09	------	10/02	11/09	9/07
578	Stream Crossing	ENG	12/04	2/	------	------	11/09	7/05
395	Stream Habitat Improvement & Management	BIO	4/07	4/	------	------	3/04	8/04
580	Streambank and Shoreline Protection	ENG	7/05	11/09	------	7/05	11/09	7/05
585	Stripcropping	AGRON	4/07	5/	-----	------	-----	4/07
587	Structure for Water Control	ENG	5/10	------	------	5/10	5/10	5/10
587A	Structure for Water Control, Corrugated Metal Pipe	ENG	------	5/10	------	5/10	------	------
587C	Structure for Water Control, Fish Screen	ENG	------	5/10	------	5/10	5/10	------
587B	Structure for Water Control, Plastic Pipe Culverts	ENG	------	5/10	------	5/10	------	------
587D	Structure for Water Control, Russian River Pilot	ENG	------	5/10	------	5/10	5/10	------

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606	Subsurface Drain	ENG	9/04	------	------	------	11/09	8/04
606A	Subsurface Drain, Tubing, 15 Inches or Less	ENG	------	11/09	------	9/04	------	------
607	Surface Drainage, Field Ditch	ENG-AGRON	6/08	11/09	------	3/04	11/09	8/04
607A	Surface Drainage, Field Ditch, Vegetated Agricultural Drainage Ditch	ENG-AGRON	------	6/08	------	6/08	------	------
608	Surface Drainage, Main or Lateral	ENG	10/03	11/09	------	10/03	11/09	8/04
609	Surface Roughening	AGRON	10/02	7/00	------	7/00	------	8/04
600	Terrace	ENG	11/09	2/	------	------	11/09	11/09
612	Tree/Shrub Establishment	FOR	8/06	------	------	------	------	8/06
612A	Tree/Shrub Establishment, Bareroot/Containerized Stock	FOR	------	8/06	------	8/06	------	------
612B	Tree/Shrub Establishment, Direct Seeding	FOR	------	8/06	------	8/06	------	------
612C	Tree/Shrub Establishment, Pole Plantings/Cuttings	FOR	------	8/06	------	8/06	------	------
660	Tree/Shrub Pruning	FOR	8/06	8/06	------	8/06	------	8/06
490	Tree/Shrub Site Preparation	FOR	6/08	------	------	------	------	------
490A	Windbreaks/Hedgerows Site Preparation	FOR	------	10/02	------	10/02	------	------
490B	Forest Site Preparation	FOR	------	10/02	------	10/02	------	------
620	Underground Outlet	ENG	11/09	11/09	------	11/09	11/09	11/09
645	Upland Wildlife Habitat Management	BIO	4/07	4/	------	------	------	8/04
635	Vegetated Treatment Area	ENG-AGRON	11/09	2/	------	------	11/09	11/09
601	Vegetative Barrier	AGRON	4/07	5/	------	------	------	4/07
630	Vertical Drain	ENG	12/04	2/	------	------	11/09	8/04
367	Waste Facility Cover	ENG	9/04	2/	------	------	------	8/04
313	Waste Storage Facility	ENG	9/07	------	------	------	11/09	8/04
313C	Waste Storage Facility, Concrete Structure	ENG	------	11/09	------	9/04	------	------

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313B	Waste Storage Facility, Pond	ENG	------	11/09	------	9/04	------	------
313A	Waste Storage Facility, Shotcrete Structure	ENG	------	11/09	------	9/04	------	------
629	Waste Treatment	ENG	8/06	2/	------	------	11/09	8/06
359	Waste Treatment Lagoon	ENG	9/04	11/09	------	9/04	11/09	8/04
633	Waste Utilization	AGRON-ENG	4/07	2/	------	------	------	8/04
638	Water and Sediment Control Basin	ENG	11/09	2/	------	11/09	11/09	11/09
636	Water Harvesting Catchment	ENG	9/04	2/	------	------	11/09	8/04
642	Water Well	ENG	1/06	11/09	------	1/06	11/09	1/06
614	Watering Facility	ENG	9/07	11/09	------	10/02	11/09	8/04
640	Waterspreading	ENG	10/03	2/	------	------	11/09	8/04
351	Well Decommissioning	ENG	9/04	2/	------	------	11/09	8/04
355	Well Water Testing	ENG	7/05	2/	------	7/05	------	7/05
658	Wetland Creation	BIO-ENG	8/06	2/	------	------	11/09	8/04
659	Wetland Enhancement	BIO-ENG	5/10	2/	------	------	11/09	8/04
657	Wetland Restoration	BIO-ENG	8/06	2/	------	------	11/09	8/04
644	Wetland Wildlife Habitat Management	BIO	4/07	4/	------	------	------	8/04
380	Windbreak/Shelterbelt Establishment	FOR-BIO	10/02	7/00	------	------	------	8/04
650	Windbreak/Shelterbelt Renovation	FOR-BIO	10/02	10/02	------	10/02	------	8/04

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INDEX OF CONSTRUCTION SPECIFICATIONS

CODE	PRACTICE NAME	RESPONSIBLE DISCIPLINE	DATE OF CURRENT: CONSTRUCTION SPECIFICATION	LAST REVIEW
900	Concrete (3000 psi)	ENG	11/09	11/09
901	Concrete (4000 psi)	ENG	11/09	11/09
902	Concrete Block Structure	ENG	7/05	7/05
909	Control of Water (to facilitate construction)	ENG	7/05	7/05
903	Earthfill	ENG	7/05	7/05
904	Gabions	ENG	7/05	7/05
905	Geotextile Fabric	ENG	7/05	7/05
908	Grouted Rock Riprap	ENG	7/05	7/05
906	Post and Wire Revetment	ENG	7/05	7/05
907	Rock Riprap	ENG	6/08	6/08

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				----------DATE OF CURRENT----------				
CODE	**PRACTICE NAME**	**Responsible Discipline(s)**	**CA Standard**	**CA Specifi-cation**	**Material Specif-ication**	**Practice Require-ments**	**Operation & Main-tenance**	**Statement of Work**
309	Agrichemical Handling Facility	ENG	6/08	2/	------	6/08	11/09	6/08
310	Bedding	ENG	3/04	2/	------	------	11/09	8/04
311	Alley Cropping	FOR	10/02	3/	------	------	------	8/04
313	Waste Storage Facility	ENG	9/07	------	------	------	11/09	8/04
313A	Waste Storage Facility, Shotcrete Structure	ENG	------	11/09	------	9/04	------	------
313B	Waste Storage Facility, Pond	ENG	------	11/09	------	9/04	------	------
313C	Waste Storage Facility, Concrete Structure	ENG	------	11/09	------	9/04	------	------
314	Brush Management	RANGE	4/07	10/02	------	7/00	------	8/04
314A	Brush Management, Juniper Control	RANGE	------	5/10	------	5/10	------	------
316	Animal Mortality Facility	ENG	3/04	2/	------	3/04	------	8/04
317	Composting Facility	ENG-AGRON	9/04	2/	------	------	11/09	8/04
320	Irrigation Canal or Lateral	ENG	3/04	11/09	------	3/04	11/09	8/04
322	Channel Bank Vegetation	AGRON	4/07	7/00	------	7/00	------	8/04
324	Deep Tillage	AGRON	10/02	5/	------	------	------	8/04
326	Clearing and Snagging	ENG	10/03	11/09	------	10/03	11/09	8/04
327	Conservation Cover	AGRON-BIO	9/07	7/00	------	7/00	------	8/04
328	Conservation Crop Rotation	AGRON	10/02	7/00	------	7/00	------	8/04
329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	AGRON	9/07	6/08	------	6/08	------	6/08
330	Contour Farming	AGRON	10/02	7/00	------	7/00	------	8/04
331	Contour Orchard and Other Fruit Area	AGRON	4/07	7/00	------	------	------	8/04
332	Contour Buffer Strips	AGRON	7/00	5/	------	------	------	8/04
338	Prescribed Burning	FOR	6/08	10/02	------	10/02	------	8/04
340	Cover Crop	AGRON	4/07	9/07	------	6/08	------	8/04
342	Critical Area Planting	AGRON-BIO	4/07	------	------	------	------	8/04
342A	Critical Area Planting, Straw Mulch	AGRON-BIO	------	7/00	------	7/00	------	------

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342B	Critical Area Planting, Hydro- Mulch	AGRON-BIO	------	7/00	------	7/00	------	------
342C	Critical Area Planting, Split Hydro-Mulch	AGRON-BIO	------	7/00	------	7/00	------	------
342D	Critical Area Planting, Tackified Straw	AGRON-BIO	------	7/00	------	7/00	------	------
342E	Critical Area Planting, Erosion Control Blanket	AGRON-BIO	------	7/00	------	7/00	------	------
342F	Critical Area Planting, Bermudagrass	AGRON-BIO	------	7/00	------	7/00	------	------
342G	Critical Area Planting, Woody Cuttings	AGRON-BIO	------	7/00	------	7/00	------	------
342H	Critical Area Planting, Container Plants	AGRON-BIO	------	7/00	------	7/00	------	------
342I	Critical Area Planting, Dune Stabilization	AGRON-BIO	------	7/00	------	7/00	------	------
344	Residue Management, Seasonal	AGRON	4/07	7/00	------	7/00	------	4/07
344A	Residue Management, Seasonal, Rice Residue	AGRON	------	7/00	------	7/00	------	------
345	Residue and Tillage Management, Mulch Till	AGRON	4/07	6/08	-----	6/08	-----	4/07
346	Residue and Tillage Management, Ridge Till	AGRON	4/07	6/08	-----	6/08	-----	4/07
348	Dam, Diversion	ENG	10/02	11/09	------	10/02	11/09	8/04
350	Sediment Basin	ENG	9/04	2/	------	------	11/09	8/04
351	Well Decommissioning	ENG	9/04	2/	------	------	11/09	8/04
353	Monitoring Well	ENG	9/04	2/	------	------	11/09	8/04
355	Well Water Testing	ENG	7/05	2/	------	7/05	------	7/05
356	Dike	ENG	6/08	11/09	------	10/03	11/09	8/04
359	Waste Treatment Lagoon	ENG	9/04	11/09	------	9/04	11/09	8/04
360	Closure of Waste Impoundments	ENG	8/06	2/	------	------	11/09	8/04
362	Diversion	ENG	10/02	11/09	------	10/02	11/09	8/04
365	Anaerobic Digester, Ambient Temp.	ENG	9/04	2/	------	------	------	7/05

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366	Anaerobic Digester, Controlled Temperature	ENG	9/04	2/	------	------	------	7/05
367	Waste Facility Cover	ENG	9/04	2/	------	------	------	8/04
370	Atmospheric Resource Quality Management	AIR QUALITY	12/05	------	------	------	------	12/05
370A	Atmospheric Resource Quality Management (A), Dust/Particulate Matter	AIR QUALITY	------	12/05	------	------	------	------
370A1	Atmospheric Resource Quality Management, Dust/Particulate Matter – Unpaved Roads/Equipment Yards	AIR QUALITY	------	------	------	12/05	------	------
370A2	Atmospheric Resource Quality Management, Dust/Particulate Matter - On-Field Cultivation/Harvesting Activities	AIR QUALITY	------	------	------	12/05	------	------
370A3	Atmospheric Resource Quality Management, Dust/Particulate Matter - Confined Animal Feeding Operations (CAFO)	AIR QUALITY	------	------	------	12/05	------	------
370B	Atmospheric Resource Quality Management, Smoke Reduction-Field Crops/Orchard/Vineyard	AIR QUALITY	------	12/05	------	12/05	------	------
370C	Atmospheric Resource Quality Management, Odor	AIR QUALITY	------	12/05	------	12/05	------	------
370D	Atmospheric Resource Quality Management, Greenhouse Gases	AIR QUALITY	------	12/05	------	12/05	------	------
370E	Atmospheric Resource Quality Management, Ammonia Loss Reduction	AIR QUALITY	------	12/05	------	12/05	------	------
370F	Atmospheric Resource Quality Management, Ozone	AIR QUALITY	------	12/05	------	------	------	------
370F1	Atmospheric Resource Quality Management, Ozone (NOx) - Engines	AIR QUALITY	------	------	------	12/05	------	------
370F2	Atmospheric Resource Quality Management, Ozone – Volatile Organic Compounds – Pesticides	AIR QUALITY	------	------	------	12/05	------	------

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370F3	Atmospheric Resource Quality Management, Ozone – Volatile Organic Compounds – Livestock Waste Management	AIR QUALITY	------	------	------	12/05	------	------
378	Pond	ENG	8/06	11/09	------	10/03	11/09	8/04
380	Windbreak/Shelterbelt Establishment	FOR-BIO	10/02	7/00	------	------	------	8/04
382	Fence	RANGE	4/07	------	------	------	------	8/04
382A	Fence, Standard	RANGE	------	7/00	------	7/00	------	------
382B	Fence, Suspension	RANGE	------	7/00	------	7/00	------	------
382C	Fence, Electrical	RANGE	------	7/00	------	7/00	------	------
383	Fuel Break	FOR	4/07	3/	-----	------	-----	4/07
384	Forest Slash Treatment	FOR	6/08	3/	-----	------	-----	-----
386	Field Border	AGRON-ENG	9/07	11/09	------	9/04	------	8/04
388	Irrigation Field Ditch	ENG	3/04	11/09	------	3/04	11/09	8/04
390	Riparian Herbaceous Cover	BIO	4/07	4/	------	8/06	------	8/04
391	Riparian Forest Buffer	FOR	8/06	8/06	------	8/06	------	8/04
393	Filter Strip	ENG-AGRON	8/06	2/	------	------	11/09	8/04
394	Firebreak	FOR	4/07	------	------	------	------	4/07
394A	Firebreak, Standard	FOR	------	10/02	------	10/02	------	------
394B	Firebreak, Fuel-Break	FOR	------	7/00	------	10/02	------	------
395	Stream Habitat Improvement & Management	BIO	4/07	4/	------	------	3/04	8/04
396	Fish Passage	BIO-ENG	4/07	2/	------	------	11/09	7/05
397	Aquaculture Ponds	BIO-ENG	3/04	2/	------	------	11/09	8/04
398	Fish Raceway or Tank	BIO-ENG	9/04	2/	------	------	11/09	7/05
399	Fishpond Management	BIO	4/07	4/	------	------	------	8/04
402	Dam	ENG	10/03	2/	------	10/03	11/09	7/05
410	Grade Stabilization Structure	ENG	7/00	11/09	------	7/00	11/09	8/04

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410A	Grade Stabilization Structure, Rock Drops	ENG	------	11/09	------	7/00	------	------
412	Grassed Waterway	AGRON-ENG	11/09	11/09	------	11/09	11/09	11/09
422	Hedgerow Planting	BIO	4/07	7/00	------	7/00	------	7/05
423	Hillside Ditch	ENG	11/09	2/	------	------	11/09	11/09
428A	Irrigation Water Conveyance, Ditch & Canal Lining, Plain Concrete	ENG	3/04	11/09	------	3/04	11/09	8/04
428B	Irrigation Water Conveyance, Ditch and Canal Lining, Flexible Membrane	ENG	12/04	2/	------	------	11/09	7/05
428C	Irrigation Water Conveyance, Ditch and Canal Lining, galvanized steel	ENG	3/04	2/	------	------	11/09	8/04
430AA	Irrigation Water Conveyance, Aluminum Tubing Pipeline	ENG	7/00	2/	------	------	11/09	8/04
430CC	Irrigation Water Conveyance, Non-reinforced Concrete Pipeline	ENG	7/00	11/09	------	7/00	11/09	8/04
430DD	Irrigation Water Conveyance, High-pressure, Underground, Plastic Pipeline	ENG	7/00	11/09	7/00	7/00	11/09	8/04
430EE	Irrigation Water Conveyance, Low-pressure, Underground, Plastic Pipeline	ENG	7/00	11/09	7/00	7/00	11/09	8/04
430FF	Irrigation Water Conveyance, Steel Pipeline	ENG	10/02	11/09	------	10/02	11/09	8/04
430GG	Irrigation Water Conveyance, Reinforced Plastic Mortar Pipeline	ENG	7/00	11/09	7/00	7/00	11/09	8/04
431	Above Ground, Multi-Outlet Pipeline	ENG	9/07	11/09	-----	9/07	11/09	9/07
432	Dry Hydrant	ENG	7/00	2/	------	------	11/09	8/04
436	Irrigation Storage Reservoir	ENG	10/03	2/	------	------	11/09	8/04
441	Irrigation System, Microirrigation	ENG	9/07	11/09	------	10/02	11/09	9/07
442	Irrigation System, Sprinkler	ENG	6/09	11/09	------	8/06	11/09	8/04
442A	Irrigation System, Sprinkler, Above Ground Mainlines and Laterals	ENG	------	11/09	------	9/04	------	------

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443	Irrigation System, Surface and Subsurface	ENG	3/04	11/09	------	3/04	11/09	8/04
447	Irrigation System, Tailwater Recovery	ENG	10/02	11/09	------	10/02	11/09	8/04
449	Irrigation Water Management	ENG	4/07	11/09	------	7/00	------	4/07
450	Anionic Polyacrylamide (PAM) Erosion Control	ENG	10/02	11/09	------	10/02	11/09	8/04
453	Land Reclamation, Landslide Treatment	ENG	7/05	2/	------	------	11/09	7/05
455	Land Reclamation, Toxic Discharge Control	ENG	8/06	2/	------	------	11/09	8/04
457	Mine Shaft and Adit Closing	ENG	7/05	2/	------	------	11/09	7/05
460	Land Clearing	ENG	9/04	2/	------	------	------	8/04
462	Precision Land Forming	ENG	10/03	2/	------	------	------	8/04
464	Irrigation Land Leveling	ENG	10/02	11/09	------	10/02	11/09	8/04
466	Land Smoothing	ENG	10/03	2/	------	5/10	11/09	8/04
468	Lined Waterway or Outlet	ENG	6/06	11/09	------	10/03	11/09	8/04
472	Access Control	RANGE	5/10	------	------	------	------	5/10
482	Mole Drain	ENG	3/04	2/	------	------	------	8/04
484	Mulching	AGRON	5/10	5/10	------	5/10	------	8/04
490	Tree/Shrub Site Preparation	FOR	6/08	------	------	------	------	------
490A	Windbreaks/Hedgerows Site Preparation	FOR	------	10/02	------	10/02	------	------
490B	Forest Site Preparation	FOR	------	10/02	------	10/02	------	------
500	Obstruction Removal	ENG	10/02	2/	------	------	------	8/04
511	Forage Harvest Management	AGRON-RANGE	4/07	5/	------	------	------	8/04
512	Pasture and Hay Planting	AGRON	4/07	7/00	------	7/00	------	4/07
516	Pipeline	ENG	5/09	11/09	------	10/02	11/09	8/04
521A	Pond Sealing or Lining, Flexible Membrane	ENG	4/07	11/09	------	4/07	11/09	8/04

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521B	Pond Sealing or Lining, Soil Dispersant	ENG	10/02	11/09	------	10/03	11/09	8/04
521C	Pond Sealing or Lining, Bentonite Sealant	ENG	10/02	11/09	------	10/02	11/09	8/04
521D	Pond Sealing or Lining, Compacted Clay Treatment	ENG	8/06	11/09	------	4/07	11/09	8/06
528	Prescribed Grazing	RANGE-AGRON	6/08	------	------	------	------	6/08
528A	Prescribed Grazing, Annual Rangeland	RANGE-AGRON	------	4/07	------	4/07	------	------
528B	Prescribed Grazing, Irrigated Pasture	RANGE-AGRON	------	4/07	------	4/07	------	------
528C	Prescribed Grazing, Perennial Rangeland	RANGE-AGRON	------	4/07	------	4/07	------	------
528D	Prescribed Grazing, Wetlands	RANGE-AGRON-BIO	------	4/07	------	4/07	------	------
528E	Prescribed Grazing, Woodland/Forestland	RANGE-FOR	------	7/00	------	7/00	------	------
533	Pumping Plant	ENG	10/03	------	------	------	11/09	8/04
533A	Pumping Plant For Water Control, Air Quality – Emissions Reduction	ENG	------	10/02	------	10/02	------	------
543	Land Reconstruction, Abandoned Mined Land	AGRON-ENG	9/07	2/	------	------	11/09	9/07
544	Land Reconstruction, Currently Mined Land	AGRON-ENG	9/07	2/	------	------	11/09	9/07
548	Grazing Land Mechanical Treatment	RANGE	4/07	7/00	------	7/00	------	8/04
550	Range Planting	RANGE	9/07	7/00	------	6/08	------	8/04
550A	Range Planting – Annual Plant Species	RANGE	------	6/08	------	------	------	------
550B	Range Planting – Perennial Plant Species	RANGE	------	6/08	------	------	------	------
552	Irrigation Regulating Reservoir	ENG	10/03	2/	------	------	11/09	8/04
554	Drainage Water Management	ENG	10/02	2/	------	------	11/09	7/05

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555	Rock Barrier	ENG	10/03	2/	------	------	11/09	8/04
557	Row Arrangement	ENG	10/03	2/	------	------	------	8/04
558	Roof Runoff Structure	ENG	10/02	2/	------	------	11/09	8/04
560	Access Road	ENG	9/04	11/09	------	9/04	11/09	8/04
561	Heavy Use Area Protection	ENG	7/05	2/	------	------	11/09	8/04
561A	Heavy Use Area Protection – Coal Ash Soil Surfacing	ENG	------	5/09	------	------	------	------
562	Recreation Area Improvement	FOR	10/02	10/02	------	10/02	------	8/04
566	Recreation Land Grading and Shaping	ENG	10/02	2/	------	------	11/09	8/04
568	Recreation Trail and Walkway	ENG	10/02	2/	------	------	11/09	8/04
570	Runoff Management System	ENG	10/02	2/	------	------	11/09	8/04
572	Spoil Spreading	ENG	9/04	2/	------	------	------	8/04
574	Spring Development	ENG	9/07	11/09	------	10/02	11/09	9/07
575	Animal Trails and Walkways	ENG-RANGE	10/03	11/09	------	10/03	11/09	8/04
578	Stream Crossing	ENG	12/04	2/	------	------	11/09	7/05
580	Streambank and Shoreline Protection	ENG	7/05	11/09	------	7/05	11/09	7/05
582	Open Channel	ENG	7/00	2/	------	------	11/09	8/04
584	Channel Stabilization	ENG	10/03	11/09	------	10/03	11/09	8/04
585	Stripcropping	AGRON	4/07	5/	-----	------	-----	4/07
587	Structure for Water Control	ENG	5/10	------	------	------	5/10	5/10
587A	Structure for Water Control, Corrugated Metal Pipe	ENG	------	5/10	------	5/10	------	------
587B	Structure for Water Control, Plastic Pipe Culverts	ENG	------	5/10	------	5/10	------	------
587C	Structure for Water Control, Fish Screen	ENG	------	5/10	------	5/10	5/10	------
587D	Structure for Water Control, Russian River Pilot	ENG	------	5/10	------	5/10	5/10	------
589A	Cross Wind Ridges	AGRON	4/07	7/00	------	7/00	------	8/04

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589C	Cross Wind Trap Strips	AGRON	4/07	7/00	------	7/00	------	8/04
590	Nutrient Management	AGRON-ENG	9/07	6/08	------	6/08	------	8/04
591	Amendments for Treatment of Agricultural Waste	ENG	8/06	2/	------	------	------	8/06
592	Feed Management	AGRON-RANGE	4/07	5/	-----	------	-----	4/07
595	Pest Management	AGRON	9/07	10/04	------	9/07	------	8/04
600	Terrace	ENG	11/09	2/	------	------	11/09	11/09
601	Vegetative Barrier	AGRON	4/07	5/	------	------	------	4/07
603	Herbaceous Wind Barriers	FOR	4/07	10/02	------	10/02	------	4/07
606	Subsurface Drain	ENG	9/04	------	------	------	11/09	8/04
606A	Subsurface Drain, Tubing, 15 Inches or Less	ENG	------	11/09	------	9/04	------	------
607	Surface Drainage, Field Ditch	ENG-AGRON	6/08	11/09	------	3/04	11/09	8/04
607A	Surface Drainage, Field Ditch, Vegetated Agricultural Drainage Ditch	ENG-AGRON	------	6/08	------	6/08	------	------
608	Surface Drainage, Main or Lateral	ENG	10/03	11/09	------	10/03	11/09	8/04
609	Surface Roughening	AGRON	10/02	7/00	------	7/00	------	8/04
610	Salinity and Sodic Soil Management	ENG-AGRON	8/06	------	------	------	------	8/06
610 A	Salinity and Sodic Soil Management, Irrigated Lands	ENG-AGRON	------	11/09	------	8/06	------	------
612	Tree/Shrub Establishment	FOR	8/06	------	------	------	------	8/06
612A	Tree/Shrub Establishment, Bareroot/Containerized Stock	FOR	------	8/06	------	8/06	------	------
612B	Tree/Shrub Establishment, Direct Seeding	FOR	------	8/06	------	8/06	------	------
612C	Tree/Shrub Establishment, Pole Plantings/Cuttings	FOR	------	8/06	------	8/06	------	------
614	Watering Facility	ENG	9/07	11/09	------	10/02	11/09	8/04

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INDEX OF CONSERVATION PRACTICE STANDARDS AND SPECIFICATIONS
(Listed in Numeric Order by Code Number)

CODE	PRACTICE NAME	Responsible Discipline(s)	CA Standard	DATE OF CURRENT: CA Specification	Material Specification	Practice Requirements	Operation & Maintenance	Statement of Work
620	Underground Outlet	ENG	11/09	11/09	------	11/09	11/09	11/09
629	Waste Treatment	ENG	8/06	2/	------	------	11/09	8/06
630	Vertical Drain	ENG	12/04	2/	------	------	11/09	8/04
632	Solid/Liquid Waste Separation Facility	ENG	6/09	2/	------	------	11/09	8/06
633	Waste Utilization	AGRON-ENG	4/07	2/	------	------	------	8/04
634	Manure Transfer	ENG	7/05	2/	------	8/06	11/09	8/04
635	Vegetated Treatment Area	ENG	11/09	2/	------	------	11/09	11/09
636	Water Harvesting Catchment	ENG	9/04	2/	------	------	11/09	8/04
638	Water and Sediment Control Basin	ENG	11/09	2/	------	11/09	11/09	11/09
640	Waterspreading	ENG	10/03	2/	------	------	11/09	8/04
642	Water Well	ENG	1/06	11/09	------	1/06	11/09	1/06
643	Restoration and Management of Rare or Declining Habitats	BIO	4/07	4/	------	------	------	-----
644	Wetland Wildlife Habitat Management	BIO	4/07	4/	------	------	------	8/04
645	Upland Wildlife Habitat Management	BIO	4/07	4/	------	------	------	8/04
646	Shallow Water Development and Management	BIO	4/07	4/	------	------	------	-----
647	Early Successional Habitat Development/Management	BIO	4/07	4/	------	-----	------	8/04
650	Windbreak/Shelterbelt Renovation	FOR-BIO	10/02	10/02	------	10/02	------	8/04
654	Road/Trail/Landing Closure and Treatment	FOR	6/09	6/09		6/09	6/09	6/09
655	Forest Trails and Landings	FOR	6/08	10/02	------	10/02	------	8/04
656	Constructed Wetland	ENG-BIO	6/08	2/	------	------	11/09	8/04
657	Wetland Restoration	BIO-ENG	8/06	2/	------	------	11/09	8/04
658	Wetland Creation	BIO-ENG	8/06	2/	------	------	11/09	8/04
659	Wetland Enhancement	BIO-ENG	5/10	2/	------	------	11/09	8/04
660	Tree/Shrub Pruning	FOR	8/06	8/06	------	8/06	------	8/06
666	Forest Stand Improvement	FOR	6/08	------	------	------	------	8/04

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INDEX OF CONSERVATION PRACTICE STANDARDS AND SPECIFICATIONS
(Listed in Numeric Order by Code Number)

				DATE OF CURRENT				
CODE	**PRACTICE NAME**	**Responsible Discipline(s)**	**CA Standard**	**CA Specifi-cation**	**Material Specif-ication**	**Practice Require-ments**	**Operation & Main-tenance**	**Statement of Work**
666A	Forest Stand Improvement, Coastal Douglas Fir/Redwood	FOR	------	10/02	------	10/02	------	------
666B	Forest Stand Improvement, Ponderosa Pine/Jeffrey Pine/Sierra Nevada Mixed Conifer	FOR	------	10/02	------	7/00	------	------
666C	Forest Stand Improvement, Aspen/Cottonwood/Other	FOR	------	10/02	------	10/02	------	------
666D	Forest Stand Improvement, Competing Vegetation Control	FOR	------	10/02	------	10/02	------	------
718	Precision Pest Control Application 1/	AIR QUALITY	5/09	6/08	------	6/08	6/08	6/08
718	Precision Pest Control Application - Ozone 1/	AIR QUALITY		6/08	------	6/08	------	------
723	Combustion System Air Emissions Management 1/	AIR QUALITY	5/09	-----	-----	-----	------	------
729	Dust Control on Unpaved Roads and Surfaces 1/	AIR QUALITY	9/07	6/08	------	6/08	------	------
740	Pond Sealing or Lining, Soil Cement 1/	ENG	6/08	11/09	------	6/08	11/09	1/06
798	Seasonal High Tunnel System for Crops 1/	ENG-AGRON	5/10	5/10	------	5/10	------	5/10

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CODE	PRACTICE NAME	Responsible Discipline(s)	CA Standard	DATE OF CURRENT: CA Specification	Material Specification	Practice Requirements	Operation & Maintenance	Statement of Work

INDEX OF CONSTRUCTION SPECIFICATIONS

CODE	PRACTICE NAME	RESPONSIBLE DISCIPLINE	DATE OF CURRENT: CONSTRUCTION SPECIFICATION	LAST REVIEW
901	Concrete	ENG	9/07	9/07
902	Concrete Block Structure	ENG	7/05	7/05
903	Earthfill	ENG	7/05	7/05
904	Gabions	ENG	7/05	7/05
905	Geotextile Fabric	ENG	7/05	7/05
906	Post and Wire Revetment	ENG	7/05	7/05
907	Rock Riprap	ENG	6/08	6/08
908	Grouted Rock Riprap	ENG	7/05	7/05
909	Control of Water (to facilitate construction)	ENG	7/05	7/05

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Attachment A

Comprehensive Nutrient Management Plan Criteria (California)
Practice/Activity Code (102) (No.)

1. Definition

A CNMP is a conservation plan that is unique to animal feeding operations. It is a grouping of conservation practices and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. A CNMP incorporates practices to utilize animal manure and organic by-products as a beneficial resource. A CNMP addresses natural resource concerns dealing with soil erosion, manure, and organic by-products and their potential impacts on water quality, which may derive from an AFO. A CNMP is developed to assist an AFO owner/operator in meeting all applicable local, tribal, State, and Federal water quality goals or regulations. For nutrient impaired stream segments or water bodies, additional management activities or conservation practices may be required to meet local, tribal, State, or Federal water quality goals or regulations. For land units draining to water bodies identified as impaired by agricultural sources of phosphorus (P) the California P Index will be used to evaluate the risk of P loss and prepare recommendations to limit it.

The conservation practices and management activities planned and implemented as part of a CNMP must meet NRCS technical standards. For those elements included by an owner and/or operator in a CNMP for which NRCS currently does not maintain technical standards (i.e., vector control, air quality), producers should meet criteria established by Land Grant Universities, industry, or other technically qualified entities.

Technical Guidance, Criteria, and Content for CNMP preparation in California can be found at:

http://www.ca.nrcs.usda.gov/technical/cnmp/index.html

Additional guidance is available in the National Planning Procedures Handbook (NPPH) - http://directives.sc.egov.usda.gov/. Navigate to:

Title 180 – Conservation Planning and Application
Part 600 - National Planning Procedures Handbook
Subpart E - Comprehensive Nutrient Management Planning Technical Guidance

Agricultural Energy Management Plan Criteria
Practice/Activity Code (122) (No.)

1. Definition

An Agricultural Energy Management Plan (AgEMP) contains the strategy by which the producer will explore and address his/her on-farm energy problems and opportunities.

2. AgEMP Criteria:

This section establishes the minimum criteria to be addressed in the development of AgEMP.

A. General Criteria

1. An Environmental Evaluation (EE) (CPA 52) is to be prepared for all activity plans to demonstrate NRCS compliance with the National Environmental Policy Act, National Historic Preservation Act, Endangered Species Act, Environmental Justice, Air Quality, and other designated environmental concerns and environmental laws. The environmental effects from the activity plans on environmental resource concerns should be clearly documented on the EE (CPA-52 form). The following is abbreviated guidance for preparation of the EE:

    a. Planners and TSPs should follow the EE guidance delineated in the National Environmental Compliance Handbook.

    b. The EE describes the existing conditions for all applicable resource concerns.

    c. The EE will assess the resources potentially impacted by the no action, proposed action and any reasonable alternatives.

    d. Guide sheets will accompany the EE, as needed, to provide information on how to assess and deal with special environmental concerns.

    e. The findings section of the EE is to identify whether NRCS has determined based on the analysis of the EE: (1) that a site specific environmental assessment (EA) or an environmental impact statement (EIS) should be prepared based on the significance of potential impacts, or (2) the EE can be tiered to a state, regional, or national programmatic EA or EIS because the proposed effects have been sufficiently analyzed in a state, regional, national programmatic EA or EIS.

    f. TSP and planners are required to complete NRCS' Level I Environmental Compliance training prior to prepare any EE CPA 52.

2. An AgEMP shall be developed by certified Technical Service Providers (TSPs). In accordance with Section 1240 (A), the Environmental Quality Incentive Program (EQIP) program provides funding support through contracts with eligible producers to obtain services of certified TSPs for development of AgEMP. The specific TSP criteria required for AgEMP development is located on the TSP registry (TechReg) web site at: http://techreg.usda.gov/

B. The AgEMP plan shall address and document the following elements:

1. Background and site information;
2. Energy audit for the Headquarters' Operation and the Landscape (Working Lands);
3. Energy conservation practices planned;
4. Reference documents.

C. AgEMP Element Specific Criteria

1. Each of the AgEMP elements will address specific criteria. The degree to which these elements are addressed in the development and implementation of a site-specific AgEMP is determined by the General Criteria in Section A and the specific criteria provided for each element of the AgEMP identified below.
2. Background and Site Information - This element provides a brief description of:
   a. Name of producer
   b. Facility location(s) and mailing address
   c. Type and size of the operation
   d. Resource Concerns and Special Environmental Concerns: Extract from State's current CPA-52, Environmental Evaluation Worksheet—in National Environmental Compliance Handbook—includes benchmark conditions for all resource concerns and special environmental concerns (e.g. soil, water, air, plants, animals, and social and economic concerns. This is just a checklist and the level of resolution for inventory of these resource concerns may vary depending upon the nature, size, and intensity of possible positive and negative effects to these resources.
   e. Producer concerns
3. On-farm Energy Audit: This element determines and documents current energy usage, over the past annual cycle, and provides cost-effective alternatives and recommendations for energy conservation of each farm enterprise. A field crop system and livestock production system on the same farm would be considered two separate enterprises. The evaluation of energy conservation activities shall include energy used in the cultivation, protection, harvesting, processing and storage of agricultural crops and in the feeding, housing, and processing of farm animals and animal products, and wildlife enhancement activities.
4. Definitions:
   a. Energy: Fuels (purchased propane, diesel and natural gas) and electricity used to perform stationary farm and ranch activities. This definition includes renewable energy sources.
   b. Energy Management: Optimization of energy use on farms and ranches to minimize non-renewable energy consumption.

c. Certified Energy Auditor: A person who has the technical qualifications to perform an agricultural energy audit.

d. Energy Source: The type of fuel (liquid or gas), electricity or renewable power used to perform farm and ranch activities.

e. Current Energy Usage: The annual usage of grid electricity and/or natural gas and purchased fuels (liquid or gas) for stationary farm or ranch operations.

f. Carbon Footprint: The total annual (net) emissions of greenhouse gases caused directly and indirectly by a farm or ranch operation and expressed in equivalent tons of Carbon Dioxide (CO2) per year.

5. Criteria for Headquarters Energy Audit - The Energy Audit is to be tailored to the individual farm and should cover the primary energy users such as irrigation pumping, heating and cooling of livestock production facilities, manure collection and transfer, grain drying and similar common on-farm activities.
   a. Current energy usage – describe activity and primary equipment involved with each headquarters operation.
   b. Recommended energy improvements and estimated cost.
   c. Expected energy savings from these improvements and estimated payback period in years.
   d. Document the type of energy resource used and current energy consumption by each major activity at the farm headquarters.
   e. Describe components of the major activities:
      - Manufacturer
      - Equipment component factory ratings (HP, efficiency, BTU use)
      - Management use efficiencies (ex. manual/automatic controls)
      - Estimated annual energy use
   f. Summary of energy use by energy resource
   g. Assessment - Alternatives Development
   h. Describe the planned energy saving actions
   i. Document energy savings for the major activities at the farm headquarters as BTU's, KW hours, etc. Document a simple payback period (in years) for the proposed changes.

6. NRCS Landscape (cropland, pastureland, forestland, etc.) farm energy audit content is an energy audit that is designed to (a) estimate energy use associated with current farming/ranching operations and (b) identify energy savings associated with alternative management activities. The Audit shall address energy use for the following elements (as applicable):
   a. Cropland field equipment operations - estimate energy use associated with the current field equipment operations (Compare in common units):
      - Field equipment operations

- Embedded energy in synthetic nitrogen used
- Irrigation
- Pasture management
- Forest operations

b. Specific Criteria: The Audit will address specific criteria for each element as identified below:

1) Cropland field equipment operations - Estimate energy use associated with current field equipment operations:

- Tillage
- Planting
- Harvesting
- Manure application
- Application of inorganic soil amendments and pesticides

2) Identify potential energy savings associated with alternative activities. As a minimum the analysis will address the following, as appropriate. Each item will be expressed in comparison to the existing situation with total savings expressed in common units:

- Number and type of field operations
- Trips to the field
- Trips across the field
- Precision farming practices
- Equipment maintenance and calibration
- Size of tractor relative to implement

3) Embedded energy in synthetic fertilizer, especially nitrogen. Estimate indirect energy use associated with synthetic fertilizer used in the operation. Identify potential indirect energy savings associated with alternative management activities. Analysis may include, for example:

- Presence of a professionally developed nutrient management plan that reduces the amount of fertilizers applied and minimizes losses.
- Potential adjustments to crop rotation such that the amount of nutrients is reduced by optimizing residual nutrient supplies to subsequent crop.
- Precision application techniques that minimize agrichemical needs and optimize the effectiveness of the chemicals used.

4) Irrigation: Estimate energy used in current irrigation system and identify energy savings associated with alternative equipment and management activities. Analysis may include, for example:
   - System type
   - System pressure
   - Irrigation water management techniques
   - Pumping plant evaluation
   - System maintenance
5) Pasture management: Estimate direct energy used in pasture management for example watering facilities and pasture maintenance/renovation and identify energy savings associated with alternative management and equipment. Examples include:
   - Impact of grazing management on reseeding requirements
   - Hauling distance for water/feed vs. water facility development
   - Other
6) Forest operations: Estimate current energy use associated with the forest management/harvest system and identifies energy savings associated with alternative management and equipment. Analysis might include (but not be limited to):
   - Forest trails and landings
   - Types of equipment used
   - Identify potential energy savings in other land uses associated with windbreaks/shelterbelts
   - Other

7. Conservation plan (record of decisions) *(Utilizing Customer Service Toolkit – Plug-In or MsWord Document)* conservation practices to address the energy management needs for the "AgEMP". The record of decisions shall include the planned practice, schedule for implementation, and site specific specifications to apply the conservation practice. The site specific specifications can be on an NRCS Jobsheet available for the conservation practice or in a narrative form for the non-engineering type practices. Planned engineering type practices shall

include the conservation practice, schedule of implementation, and identified on the plan map. The plan may include, but are not limited to the conservation practices listed below:

(a) Brush Management (314)

(b) Conservation Crop Rotation (328)

(c) Cover Crop (340)

(d) Conservation Cover (327)

(e) Fence (382)

(f) Herbaceous Weed Control (315)

(g) Irrigation System, Microirrigation (441)

(h) Irrigation Water Management (449)

(i) Land Smoothing (466)

(j) Mulching (484)

(k) Nutrient Management (590)

(l) Pasture and Hayland Planting (512)

(m) Pesticide Risk Mitigation (596)

(n) Pipeline (516)

(o) Prescribed Grazing (528)

(p) Residue and Tillage Management, Mulch Till (345)

(q) Residue Management, No Till/Strip Till/Direct Seed (329)

(r) Residue Management, Ridge Till (346)

(s) Residue Management, Seasonal (344)

(t) Stripcropping (585)

(u) Terrace (600)

(v) Watering Facility (614)

(w) Windbreak/Shelter Belt Establishment (380)

8. References: This element lists the technical documentation sources used for the AgEMP and may include the actual documents or web sites that contain the technical documentation useful for the producer.

9. **Deliverables for the Client – a hardcopy of the plan that includes:**
   - Cover page – name, address, phone of client and TSP; Total Acres of the Plan, signature blocks for the TSP, producer, and a signature block for the NRCS acceptance.
   - Soils map and appropriate land use soil descriptions

- The completed energy audit report will include the following sections:
  a. Summary of the facility's location, production level, any unusual factors that affect energy use, and any energy efficiency measures already in use.
  b. Summary of the site's energy use over one year, broken down by type of usage and month.
  c. Summary of how much money the producer would save if the recommended measures were included, and how much money the producer would lose if no action were taken.
  d. A list of recommended measures to reduce energy use including their annual energy (kWh, propane, fuel oil, BTU,…) savings and an estimated payback in years.
  e. A narrative summary of the recommendations made through the audit including description of technology, how the technology would affect the site, and how much energy would be saved annually by installing the equipment.
- Resource assessment results (wind and water erosion, water availability, soil fertility, and others that may be needed)
- For management practices. The planned practices and the site specific specifications on how each practice will be applied; when the practice will be applied, and the extent (acres or number) that will be applied.
- For engineering/structural practices. The planned practice when it will be applied and extent, and located on the conservation plan map.

3. **Deliverables for NRCS Field Office:**
   - Complete Hardcopy and Electronic copy of the producer's plan (MsWord copy).
   - Digital Conservation Plan Map with fields, features, and structural practices located.
   - Digital Soils Map.
   - Completed CPA 52 and appropriate worksheets.

Tools Needed

In addition to the completion of On-farm Energy Audit standard, one or more tools are needed to evaluate energy associated with tillage, agrichemicals, irrigation, pasture management and forest operations. Some tools already exist or can be made functional with minimal effort. Others will need to be developed.

Tools Available to Support the Landscape Audit

Audit Element	Tools Available or	Tool output	Already existing?

	needed		
Field Equipment Operation	• RUSLE2 • Cropland Energy Estimator (CLE). • Size of tractor relative to implement(s) used	• Fuel or BTU use per acre • Table to identify ideal tractor size for specific implements based on ASABE equipment standard	• Yes (RUSLE2 and CLE) • No
Embedded Energy in Agrichemicals	• CLE • CLE upgrade	Embedded energy in agrichemicals applied. (Current tool does not automatically adjust for management changes)	• Yes • (Upgrade needed)
Irrigation	• Energy Self-Assessment • CLE Upgrade	Fuel or Btu use per acre	• Yes • (Upgrade needed

*CLE = Cropland Energy Estimator

U.S DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
CALIFORNIA

PRACTICE REQUIREMENTS
FOR
314A - BRUSH MANAGEMENT (WESTERN JUNIPER)

For: Business Name _____

Job Location_____

County Lassen RCD_____ Farm/Tract No._____

Referral No._____Prepared By_____ Date_____

IT SHALL BE THE RESPONSIBILITY OF THE OWNER TO OBTAIN ALL NECESSARY PERMITS AND/OR RIGHTS, AND TO COMPLY WITH ALL ORDINANCES AND LAWS PERTAINING TO THIS INSTALLATION.

Installation shall be in accordance with the following drawings, specifications and special requirements. NO CHANGES ARE TO BE MADE IN THE DRAWINGS OR SPECIFICATIONS WITHOUT PRIOR APPROVAL OF THE NRCS TECHNICIAN.

1. Plan, Location Map, or Drawings, No._____ _____ _____

2. Practice Specifications_____,_____,_____

3. Goals and Objectives of this Practice: _____
_____

4. Species to be Controlled: Western juniper. _____

5. Pre-treatment and post-treatment cover or density: Before:_____ After:_____

6. Method(s) of Control and Acres Treated (If chemical treatment is required, consult attached supporting documents for evaluation of treatment alternatives):

METHOD	Manual	Mechanical (Type Specified)	Chemical (Materials will not be Specified by NRCS)
ACRES			
TIMING			

7. Total Acres Treated:_____

8. Species Benefited: ___Sagebrush spp., mountain mahogany, bitterbrush, perennial native bunchgrasses_____

9. Post Treatment Methods and Timing

METHOD	Chipping	Piling and Burning	Piling	"Drop and Drive"	Lop and Scatter
ACRES					
TIMING					

10. Monitoring Plan (methods and locations): _____
_____

11. Special Requirements: **In addition to requirements included in the Specification for this practice and those provided above, the following special requirements apply: NON-TARGET SPECIES:** Clearing will be limited to western juniper. Other species, including but not limited to, bitterbrush, mountain mahogany, sagebrush, pine, spruce, and fir, will not be cleared. **JUNIPER AGE CLASS:** Old-growth juniper will not be treated or removed under this practice.

PRACTICE APPROVAL:

Job Classification:

Show the limiting elements for this job. This job is classified as, Class _____I_____

Limiting elements:	Units
_____Soil moisture_____	_____
_____Topography_____	_____
_____Fire hazard_____	_____
_____	_____

Area Treated = _____ acres

Approved by:_____ Date:_____

_____

LANDOWNER'S/OPERATOR'S ACKNOWLEDGEMENT:

The landowner/operator acknowledges that:

a. He/she has received a copy of the drawings and specification, and that he/she has an understanding of the contents and the requirements.

b. He/she has obtained all the necessary permits.

c. No changes will be made in the installation of the job without prior concurrence of the NRCS technician.

d. Maintenance of the installed work is necessary for proper performance during the project life.

Accepted by:_____ Date:_____

PRACTICE COMPLETION:

I have made an on site inspection of the site (or I am accepting owner/contractor documentation), and have determined that the job as installed does conform to the drawings and practice specifications.

Completion by:

/s/_____ Date _____

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

BRUSH MANAGEMENT – JUNIPER CONTROL

(Acre)
314A

I. SCOPE

The work shall consist of removal invading new-growth (less than 100 years old) juniper from sagebrush steppe and associated grassland and rangeland habitats consistent with the goals and objectives for this practice. This specification applies to those areas where understory sagebrush steppe plant species remain intact on site and where treatment of juniper is most likely to facilitate recovery of the desired habitat.

Post-treatment cover levels of new-growth juniper is assumed to approach 0% except where associated with rock outcrops, lava spurs or areas specifically identified within the treatment plan.

II. AREAS AND TIMING

The areas to be treated shall be shown on the plans and, the methods used, target species, and timing of treatment are all shown on the practice requirement sheet and supporting materials.

III. GENERAL REQUIREMENTS

Old growth juniper shall be flagged in advance and excluded from this treatment. Consult diagram 1(a) for details regarding differentiating between old growth and new growth juniper.

A cultural resources survey will be completed and resulting requirements incorporated into applications of this practice so no disturbance occurs to identified cultural resources. This cultural resource survey will occur prior to mechanical, manual treatment or other site disturbance from such activities and including but not limited to the development temporary mechanical access roads, burning of piled materials and establishment of trails, skid trails, and associated landings. These avoidance measures are also applicable to any associated post-treatment operations such as application of erosion control measures and temporary road deconstruction.

In areas where individual juniper plants to be treated are in excess of 12” DBH (diameter at breast height), the site shall not be mechanically or manually treated except with concurrence from the NRCS State or Area Cultural Resources Specialist in consultation with the State Historic Preservation Officer.

Damage to non-juniper species shall be minimized except where consistent with the goals and purpose of the conservation plan. Such species will be identified in the plans, practice requirement sheet and supporting materials.

Rock outcrops and lava spurs shall remain untreated except where specifically identified as consistent with a habitat recovery plan for the site.

Where livestock grazing occurs within the treatment area, released vegetation shall be allowed to recover prior to grazing. A grazing plan will be developed consistent with the goals of the conservation plan.

Treatment equipment shall not be used or traffic across eroding features, riparian zones, springs, wetlands and aspen stands. Unless specifically noted in the treatment plan and supporting maps, manual methods shall replace mechanical treatment where treatment is to occur within 25’ of any perennial stream, seasonal stream, spring or pond. Where tracked vehicles are used, turning in-place should be minimized to avoid unnecessary impacts to soils, non-target plants and other resources.

The road/traffic plan shall be adhered to as consistent with minimizing impacts to cultural and natural resources. The road/traffic plan establishes the primary access routes for repeated vehicular traffic to, from and across the treatment area including identification of primary skid trails, landings, and burn pile locations in order to minimize disturbance throughout the treatment period. Populations of sensitive plant species and/or habitat as identified on the practice requirement sheet and/or supporting documentation will be avoided such that vehicle traffic, skidding and other associated activities reduce potential impacts to identified resources.

Crossing with equipment through natural drainages on the landscape will be avoided and where crossings are

necessary and identified on the road/traffic plan, the number of passes will be minimized. Measures will be taken to avoid creating artificial drainage networks which increase the likelihood of erosion; road berms, tire ruts and other artificial diversions associated with this treatment will be removed or modified in order to reduce hydrologic connectivity which can lead to gully development and impacts to off-site resources.

All trails/roads, burn pile locations, slash trails and sensitive resources will be flagged on site in advance of the treatment and in accordance with this specification, the practice requirement sheet and supporting documentation such as the cultural resource survey, the road/traffic plan, botanical surveys and other site-specific requirements supporting the appropriate implementation of this practice.

Unless otherwise noted on the practice requirement sheet, areas of soil disturbance such as skid trails and temporary roads will be protected from erosion through the placement of juniper slash sufficient to reduce rate of overland water flow and raindrop impact. Where identified on the practice requirement sheet, seeding for erosion control will be consistent with Critical Area Planting (342) or Range Planting (550).

Prior to arriving at the treatment site, all equipment will be cleaned in order to reduce the introduction of noxious weed seed such as cheatgrass and medusahead. Treatment equipment will be cleaned prior to departing the site and personnel transport vehicles will be inspected daily or as needed to prevent the spread of such noxious species between sites.

Dry season operations will be done in a manner consistent with fire safety precautions and in reference to up to date information from local, state and federal fire authorities. Activities performed under this practice will be achieved in a manner in consideration of fire and fuel loading issues regardless of the timing of the treatment. In most cases, it will be necessary to consult with fire authorities prior to implementing the practice in order to assess relative risk to on-site and/or off-site as a result of fuel loading in the treatment area. Except where specifically consistent with an approved burn plan, the distribution of downed material will be in a manner which reduces the occurrence of ladder fuels and/or places on or off-site resources at undue risk of ignition.

IV. METHODS

Methods to be used are described in the conservation plan and noted on the practice requirement sheet and supporting materials:

- Manual Treatment - Individual plants are removed by chainsaw or other hand-held cutting tools.

- Mechanical Treatment - Individual plants are removed using tracked feller buncher, hydraulic sheer, articulated grinder, Hydro-Ax or other equipment specified in the plans and shown on the practice requirement sheet. All mechanical treatments are limited to where average slopes are less than 25% in order to reduce impacts of mechanical treatment on non-target species and soil condition. .

- Chemical Treatment – Individual or groups of plants are treated using approved materials consistent with label and other legal requirements.

V. POST-TREATMENT OPERATIONS

Post-treatment of coarse woody debris will be consistent with the goals and objectives of the conservation plan and as detailed in the practice requirement sheet and supporting materials. Soil disturbance will be minimized through adherence to the road/traffic plan and temporary water diversions such as waterbars will be removed where accumulation of surface flows are likely to result in gully erosion and/or impacts to on-site and/or off-site resources.

Post-treatment operations include:

- Chipping – Coarse woody debris is chipped on or off-site and is left on site or removed for proper disposal such as for co-gen use. Except where specifically described in the treatment plan, when left on site to naturally decompose, chip depth will not exceed 3” across the treatment area and will not exceed 2” in depth in any area exceeding 100 square feet so as to allow germination and recovery of sagebrush steppe plant species.
- Piling and Burning – In order to reduce the potential for substantial increases of invading annual plants, burning will occur when soils are frozen or saturated. Burn pile locations will be sited within the treatment area unless otherwise noted on the practice requirement sheet and supporting documentation. On-site burn pile locations will be flagged in advance

and located as described in the practice requirement sheet and/or other supporting documentation. Populations of sensitive plant species and/or habitat as identified on the practice requirement sheet and/or supporting documentation will be avoided such that burning and associated activities reduce potential impacts to identified resources. Moving and piling of slash will be done manually or mechanically stacked unless specified in the practice requirement sheet. Pushing of slash using a bulldozer blade is prohibited. Burning of piled slash will be consistent with local and state requirements such as burn permits and air quality regulations.

- Piling – Juniper piles left to provide habitat values will not exceed 5' in height and will be located as flagged in the field or less in order to improve habitat quality for sagebrush steppe dependent species. Areas where sensitive plant species occur will be avoided as indicated on the practice requirement sheet and/or supporting documentation.
- "Drop and Drive" – Where juniper is to be felled and left in place to decompose, individual trees will be limbed to reduce the height of the felled juniper to 3' or less in order to improve habitat quality for sagebrush steppe dependent species. Whenever feasible, intact sensitive species identified on the practice requirement sheet will not be inhibited by the placement of the dropped juniper or associated slash.
- Lop and Scatter – Where this approach is used, cut material is distributed in a manner which does not inhibit the release of intact sensitive species identified on the practice requirement sheet.

SUPPORTING PRACTICES

In order to achieve maximum treatment effects, the following practices are required:

- Upland Wildlife Habitat Management (645)

Depending on site conditions, monitoring results and conservation plan goals, other practices which may be highly appropriate include:

- Range Planting (550)
- Prescribed Burning (338)
- Prescribed Grazing (528)

VI. MONITORING

Monitoring will be based on the goals of the operator and/or client and purpose of this specific practice. Methodologies may vary but typical subjects of monitoring include but are not limited to:

- Plant Species Composition
- Habitat Structure

Monitoring techniques are identified by the conservation planner and implemented by the client or designated parties.

VII. MAINTENANCE

Maintenance generally consists of ongoing removal of small juniper by manual methods and in some instances, treatment of limited re-sprouting juniper.

Landings, roads and skid trails will be surveyed for undue erosion subsequent to treatment and corrective actions taken as needed to prevent hydrologic connection of non-natural drainage features.

VIII. OTHER REQUIREMENTS

The owner, operator, or other persons shall conduct all work and operations in accordance with proper safety codes for the type of equipment and operations being performed with due regard for the safety of all persons and property.

Figure 1(a) –Old Growth versus Young Growth Western

Western Juniper Growth Form* and Site Characteristics		
Characteristic	**Relatively Young Trees**	**Relatively Old Trees**
Crown shape	Conical with pointed tip	Flattened, rounded, or uneven top
Branch structure	Branches become progressively smaller from bottom to top of tree	In open stands, large branches near the base
Dead wood	Little dead wood in the bole, few dead branches, little to no foliose lichen	Dead branches, bark missing, covered by a light green lichen.
Bark	Flaky, relatively thin with limited or shallow vertical furrows	Thick, fibrous with well-developed vertical furrows
Leader growth	Terminal leader growth in the upper ¼ of the tree, usually >2 in. In open stands, leader growth >2 in. from bottom to top	Leader growth in the upper ¼ of the tree usually <1 in.
Site Location	Due to broken fire cycle, younger trees have encroached upon a range of sites, including those with fair to good quality soils. Vegetation is typically dense when compared to sites where old-growth juniper typically occurs.	Tree locations protected from recurring fire due to low fuel continuity. Typical areas include ridge tops, lava spurs and other sites of low productivity such as those with very shallow and/or rocky soils.

* Growth form and morphological characteristics vary across trees and stands so usually several characteristics are required to separate young and old.

Miller, R.F., J.D. Bates, T.J. Svejcar, F.B. Pierson, and L.E. Eddleman. 2007. Western Juniper Field Guide: Asking the Right Questions to Select Appropriate Management Actions. U.S. Geological Survey Circular 1321.

U.S DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
CALIFORNIA

PRACTICE REQUIREMENTS
FOR
466 – LAND SMOOTHING

For: Business Name_____

Job Location_____

County_____ RCD_____ Farm/Tract No._____

Referral No._____Prepared By_____ Date_____

IT SHALL BE THE RESPONSIBILITY OF THE OWNER TO OBTAIN ALL NECESSARY PERMITS AND/OR RIGHTS, AND TO COMPLY WITH ALL ORDINANCES AND LAWS PERTAINING TO THIS INSTALLATION.

Installation shall be in accordance with the following drawings, specifications and special requirements. NO CHANGES ARE TO BE MADE IN THE DRAWINGS OR SPECIFICATIONS WITHOUT PRIOR APPROVAL OF THE NRCS TECHNICIAN.

1. Drawings, No._____ _____ _____

2. Practice Specifications_____466____,_____,_____

3. Special Requirements:_____

_____

_____

_____

_____

_____

_____

_____

4. Special Maintenance Requirements:_____

_____

_____

NRCS, CA
May 2010

PRACTICE APPROVAL:

Job Classification: (Ref: Section 501 NEM)

Show the limiting elements for this job. This job is classified as, Class _____

Limiting elements:	Units
Area benefitted_____	_____acres
_____	_____
_____	_____
_____	_____

Design Approved by:_____ Date:_____

LANDOWNER'S/OPERATOR'S ACKNOWLEDGEMENT:

The landowner/operator acknowledges that:

a. He/she has received a copy of the construction drawings and specification, and that he/she has an understanding of the contents, and the requirements.

b. He/she has obtained all the necessary permits.

c. No changes will be made in the installation of the job without prior concurrence of the NRCS technician.

d. Maintenance of the installed work is necessary for proper performance during the project life.

Accepted by:_____ Date:_____

PRACTICE COMPLETION:

I have made an on site inspection of the site (or I am accepting owner/contractor documentation), and have determined that the job as installed does conform to the drawings and practice specifications.

Construction Certification by:

/s/_____ Date _____

STATEMENT OF WORK
Access Control (472)

These deliverables apply to this individual practice. For other planned practice deliverables refer to those specific Statements of Work.

DESIGN

Deliverables:

1. Design documents that demonstrate criteria in NRCS practice standard have been met and are compatible with planned and applied practices.
    a. Practice purpose(s) as identified in the conservation plan (specified products, environmental services, and/or mitigating actions to maintain resource concerns at acceptable levels)
    b. List of required permits to be obtained by the client
    c. Practice standard criteria-related computations and analyses to develop plans and specifications including but not limited to:
        i. Use-regulating activities (e.g., signage, patrolling, gates, permitting) shall be monitored and achieve the intended purpose including mitigating associated resource concerns to acceptable levels
        ii. Each activity or measure will identify the entity to be monitored and managed (animals, people, vehicles and equipment) and specify the intent, intensity, amounts, and timing of use by that entity.
        iii. Placement, location, dimensions and materials (e.g., signs, gates), and frequency of use (e.g., continuous, specific season, or specific dates) shall be described for each activity including the frequency of monitoring.
2. Written plans and specifications including sketches and drawings shall be provided to the client that adequately describe the requirements to install the practice and obtain necessary permits.
3. Documentation of needed operation and maintenance.
4. Certification that the design meets practice standard criteria and comply with applicable laws and regulations.
5. Design modifications during installation as required.

INSTALLATION

Deliverables

1. Pre-application conference with client.
2. Verification that client has obtained required permits.
3. Layout and, as applicable, field staking or marking of the practice, measure or activity according to plans and specifications including applicable layout notes.
4. Application guidance as needed.
5. Facilitate and implement required design modifications with client and original designer.
6. Advise client/NRCS on compliance issues with all federal, state, tribal, and local laws, regulations and NRCS policies during installation.
7. Certification that the application process and materials meet design and permit requirements.

CHECK OUT

Deliverables

1. Records of application.
    a. Extent of practice units applied
    b. Actual mitigation measures used and applied
2. Certification that the application meets NRCS standards and specifications and is in compliance with permits.
3. Progress reporting.

REFERENCES

- NRCS Field Office Technical Guide (eFOTG), Section IV, Practice Standard – Access Control, 472
- NRCS National Environmental Compliance Handbook, NRCS Cultural Resources Handbook

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

ACCESS CONTROL

(Ac.)

CODE 472

DEFINITION

The temporary or permanent exclusion of animals, people, vehicles, and/or equipment from an area.

PURPOSE

Achieve and maintain desired resource conditions by monitoring and managing the intensity of use by animals, people, vehicles, and/or equipment in coordination with the application schedule of practices, measures and activities specified in the conservation plan.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on all land uses.

CRITERIA

Use-regulating activities (e.g., posting of signs, patrolling, gates, fences and other barriers, permits) shall achieve the intended purpose and include mitigating associated resource concerns to acceptable levels during their installation, operation, and maintenance. Activities will complement the application schedule and life span of other practices specified in the conservation plan.

Each activity or measure will identify the entity to be monitored and regulated (animals, people, vehicles and/or equipment) and specify the intent, intensity, amounts, and timing of exclusion by that entity. Activities may involve temporary to permanent exclusion of one to all entities.

Placement, location, dimensions and materials (e.g., signs, gates), and frequency of use (e.g., continuous, specific season, or specific dates) shall be described for each activity including monitoring frequency.

CONSIDERATIONS

Even though usage of the area is monitored and controlled, the land manager and/or tenant should be advised about emergency preparedness agencies and related information, e.g., the local fire/wildfire control agency and pumper truck water sources on or near the area. Information should be designated initially and re-designated annually.

Public use may be an issue in areas where public right of access has previously been established by past use and law.

Barrier type and design should minimize impacts to non-targeted wildlife, animal movement and human health.

CULTURAL RESOURCES CONSIDERATIONS

NRCS policy is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice or associated practices in the plan could have an effect on cultural resources. The National Historic Preservation Act may require consultation with the California State Historic Preservation Officer. http://www.nrcs.usda.gov/technical/cultural.html is the primary website for cultural resources information. GM420, Part 401, the California Environmental Handbook and the California Environmental Assessment Worksheet also provide guidance on how the NRCS must account for cultural resources. The e-Field

Office Technical Guide, Section II, contains general information, with Web sites for additional information.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

ENDANGERED SPECIES CONSIDERATIONS

If during the Environmental Assessment NRCS determines that installation of this practice, along with any others proposed, will have an effect on any federal or state listed Rare, Threatened or Endangered species or their habitat, NRCS will advise the client of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the client selects one of the alternative conservation treatments for installation; or with concurrence of the client, NRCS initiates consultations concerning the listed species with the U.S. Fish and Wildlife Service

PLANS AND SPECIFICATIONS

Specifications for applying this practice shall be prepared for each area and recorded using approved specification sheets, job sheets, and narrative statements in the conservation plan, or other acceptable documentation.

OPERATION AND MAINTENANCE

Monitoring of the effectiveness of use-regulating activities will be performed routinely and at least annually with changes made to specifications and operation and maintenance requirements as necessary.

Modifications to activities and use of measures are allowed temporarily to accommodate emergency-level contingencies such as wildfire, hurricane, drought, or flood as long as resource conditions are maintained.

REFERENCES

Gucinski, H.; M.J. Furniss, R.R. Ziemer, M.H. Brookes. 2001. *Forest roads: a synthesis of scientific information*. Gen. Tech. Rep. PNWGTR-509. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

U.S. Department of Transportation, Federal Highway Administration. 2003. *Manual on Uniform Traffic Control Devices for Streets and Highways - Part 5, Traffic Control Devices for Low-Volume Roads.* Washington, DC. http://mutcd.fhwa.dot.gov/pdfs/2003r1r2/pdf_index.htm

U.S DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
CALIFORNIA

PRACTICE REQUIREMENTS
FOR
484 – MULCHING

For: Business Name_____

Job Location_____

County_____ RCD_____ Farm/Tract No._____

Referral No._____Prepared By_____ Date_____

IT SHALL BE THE RESPONSIBILITY OF THE OWNER TO OBTAIN ALL NECESSARY PERMITS AND/OR RIGHTS, AND TO COMPLY WITH ALL ORDINANCES AND LAWS PERTAINING TO THIS INSTALLATION.

Installation shall be in accordance with the following drawings, specifications and special requirements. NO CHANGES ARE TO BE MADE IN THE DRAWINGS OR SPECIFICATIONS WITHOUT PRIOR APPROVAL OF THE NRCS.

1. Drawings, No._____ _____ _____

2. Practice Specifications 484_____,_____,_____

3. Mulch_____rate_____lbs/ac

   Depth of coverage _____ inches Minimum Percent of Coverage _____ %

4. Work shall be performed within the period _____

5. Method of Applying the Mulch_____

6. Method of Anchoring the Mulch_____

   Tackifier: Type: _____ Rate: _____

   Hand Punch ___ Roller Punch ___ Crimper Punch ___ Matting ___ Plastic Netting ___

7. Plastic or geotextile mulch description and installation: _____

_____

8. Special Requirements: _____

_____

NRCS, CA
May 2010

9. Maintenance: _____

_____

PRACTICE APPROVAL:

Job Classification:

Show the limiting elements for this job. This job is classified as, Class _____

Limiting elements:	Units
_____	_____
_____	_____
_____	_____

Area Mulched = _____ acres

Approved by:_____ Date:_____

_____

LANDOWNER'S/OPERATOR'S ACKNOWLEDGEMENT:

The landowner/operator acknowledges that:

a. He/she has received a copy of the drawings and specifications, and that he/she has an understanding of the contents, and the requirements.

b. He/she has obtained all the necessary permits.

c. No changes will be made in the installation of the job without prior concurrence of the NRCS technician.

d. Maintenance of the installed work is necessary for proper performance during the project life.

Accepted by:_____ Date:_____

_____

PRACTICE COMPLETION:

I have made an on site inspection of the site (or I am accepting owner/contractor documentation), and have determined that the job as installed does conform to the drawings and practice specifications.

Completion Certification by:

/s/_____ Date _____

STATEMENT OF WORK
Mulching (484)

These deliverables apply to this individual practice. For other planned practice deliverables refer to those specific Statements of Work.

DESIGN

Deliverables:

1. Design documents that demonstrate criteria in NRCS practice standard have been met and are compatible with planned and applied practices.
    a. Practice purpose(s) as identified in the conservation plan
    b. List of required permits to be obtained by the client
    c. Compliance with NRCS national and state utility safety policy (NEM Part 503-Safety, Subpart A - Engineering Activities Affecting Utilities 503.00 through 503.06)
    d. Practice standard criteria-related computations and analyses to develop plans and specifications including but not limited to:
        i. Type of material, thickness/depth, durability
        ii. Preparatory surface treatment including vegetation measures
        iii. Application technique by material type
        iv. Additional requirements to conserve soil moisture, moderate soil temperature, control erosion, suppress weeds, establish vegetative cover, improve soil condition and increase soil fertility
2. Written plans and specifications including sketches and drawings shall be provided to the client that adequately describes the requirements to install the practice and obtain necessary permits. Plans and specifications shall be developed in accordance with the requirements of conservation practice standard Mulching (Code 484).
3. Documentation of needed operation and maintenance.
4. Certification that the design meets practice standard criteria and comply with applicable laws and regulations.
5. Design modifications during installation as required.

INSTALLATION

Deliverables

1. Pre-application conference with client.
2. Verification that client has obtained required permits.
3. Staking and layout according to plans and specifications including applicable layout notes.
4. Application guidance as needed.
5. Facilitate and implement required design modifications with client and original designer.
6. Advise client/NRCS on compliance issues with all federal, state, tribal, and local laws, regulations and NRCS policies during installation.
7. Certification that the application process and materials meet design and permit requirements.

CHECK OUT

Deliverables

1. Records of application.
    a. Extent of practice units applied
    b. Actual kinds of surface treatments used and applied
2. Certification that the application meets NRCS standards and specifications and is in compliance with permits.
3. Progress reporting.

REFERENCES

- NRCS Field Office Technical Guide (eFOTG), Section IV, Conservation Practice Standard – Mulching, 484
- National Agronomy Manual
- NRCS National Environmental Compliance Handbook
- NRCS Cultural Resources Handbook

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

484 - MULCHING

I. SCOPE

The work shall consist of furnishing all materials and placing them on the project area according to the Practice Requirements sheet to areas shown on the plan map or described in the plan.

II. MATERIALS

Straw

Straw shall be new straw derived from rice, wheat, oats, or barley. Clearance shall be obtained from the County Agricultural Commissioner, when required by law, before straw obtained outside the county in which it is to be used is delivered to the site.

Wood Fiber

Wood fiber shall be a wood cellulose fiber that contains no germination or growth inhibiting factors. The wood fiber has the property to be evenly dispersed and suspended when agitated in water. The wood fiber mulch may also be produced from the following materials:

A. Recycled wood fiber, such as wood chips or similar wood materials

B. A combination of recycled newsprint and cardboard materials that contain at least 50 percent cardboard or,

C. A combination of recycled newsprint and non-recycled wood fiber or recycled wood fiber materials that does not contain more than 50 percent newsprint

Tackifier

Tackifier material shall be of the material specified on the Practice Requirements Sheet and shall have the property to be evenly dispersed and suspended in water when agitated. It shall be colored with a nontoxic water-soluble green dye to provide a proper gauge for metering of material over ground surfaces.

Jute Matting

Jute matting shall be of cloth of uniform plain weave of undyed and unbleached jute yarn with a minimum weight of 1 pound per 10 square feet, and shall have ¾ inch square openings**.**

Excelsior Matting

Excelsior matting shall consist of a mat of wood excelsior fiber with a consistent thickness and the fiber evenly distributed over the entire area of the blanket. At least 70% of the fibers shall be 6 inches or longer in length. The topside of the blanket shall be covered with a biodegradable, extruded plastic mesh with a maximum opening size of 2 by 2 inches.

Plastic Netting

Plastic netting shall be polypropylene extruded plastic netting with square or rectangular openings not greater than 1 inch and a weight of not less than 2.6 pounds per 1000 square feet.

Staples, Pins, and Stakes

Staples, pins, and stakes shall be of metal, wood, plastic, or other acceptable material and of a length as specified on the Practice Requirements Sheet.

Plastic Mulches

Plastic mulches shall be chosen based on their purpose considering mulch properties such as durability, color, and permeability or semi-permeability of material to specific electromagnetic wavelengths or chemicals. Plastic mulch will be removed from the field and not incorporated into the soil after meeting the intended use. Plastic mulch will be recycled if possible.

Other Materials

Other materials shall be used when specified on the Practice Requirements Sheet.

III. MULCHING DATES

Mulching shall be performed prior as specified on the Practice Requirements Sheet.

IV. SITE PREPARATION

Trash, weeds, and other debris that will interfere with mulch application, effectiveness, or maintenance shall be removed. No implement shall be used that will create an excessive amount of downward movement of clods on sloping areas. Site preparation shall be suspended when soil moisture conditions are not suitable for obtaining a satisfactory surface.

V. APPLYING THE MULCH

Use one of the following methods of application as specified on the Practice Requirements Sheet.

Mulching with Wood Fiber

A wood fiber covering shall be distributed uniformly over the area in a water slurry by hydroseeder.

The slurry shall contain wood fiber at the rate of 2,000 pounds per acre with a tackifier unless a different amount is specified on the Practice Requirements Sheet.

Application rates for wood fiber mulch products that have moisture contents greater than 15 percent shall be increased by the following factor, c:

$$c: = \frac{\text{85 percent}}{\text{percent fiber (solids) in product}}$$

The application rate of the tackifier shall be consistent with the manufacturer's recommendation for the site conditions and the intended purpose unless otherwise indicated on the Practice Requirements sheet.

The hydroseeder shall be equipped with a built-in continuous agitation system of sufficient operating capacity to produce a homogenous slurry and a discharge system which will apply the slurry to the slopes at a continuous and uniform rate.

The materials shall not remain in the slurry longer than two (2) hours. Water used shall be potable water or Class 1 or 2 agricultural irrigation water.

The slurry shall be continuously mixed and shall be mixed for at least five (5) minutes after the last addition before application starts.

The slurry shall be applied uniformly over the site.

Mulching with Straw

A straw covering shall be distributed uniformly over the area at the rate specified on the Practice Requirements Sheet. The straw shall be applied by hand, blower, or other suitable equipment. If straw is applied by blower, it shall not be chopped in lengths less than 6 inches.

Anchoring the Straw Mulch

When specified on the Practice Requirements Sheet, the straw mulch shall be anchored in place. The anchoring process may include hand tools, mulching rollers, disks, or similar types of suitable equipment alone or in combination with a hydro-mulch material and shall be performed in a satisfactory manner. When specified on the Practice Requirements Sheet, hydro-mulch material alone may be used.

Anchoring may be accomplished using the following:

Hand Punching: A spade or shovel shall be used to punch the straw into the slope until 95 percent of the area has straw standing perpendicular to the slope and embedded at least 3 inches into the soil. It shall be punched from 12 to 18 inches apart.

Roller punching: A roller equipped with straight studs not less than 6 inches long, from 4 to 6 inches wide and approximately 1 inch thick shall be rolled over the slope.

Crimper Punching: A crimper with serrated disk blades about 4 to 8 inches apart shall be rolled over the slope forcing the straw mulch into the soil. Crimping should be done in two directions with the final pass across the slope.

The following shall be used on large steep areas which cannot be punched by hand or by roller:

Matting. Jute, excelsior or other matting specified on the Practice requirements Sheet shall be utilized.

Matting shall be applied up and down slope and continue beyond the edge of the mulched area at least I foot.

Matting shall be cut around objects so that it lies flat on the soil surface.

At the top of the area the matting shall be buried in a trench at least 6 inches deep.

Overlap: Sides of the rolls shall overlap at least 4 inches. Overlapping ends will have at least 6 inches of overlap with the uphill roll overlying the downhill roll.

Staple: Staples shall be driven perpendicularly into the slope and spaced approximately 5 feet apart on the sides of the rolls and approximately 1-foot apart where the ends of the rolls overlap.

Plastic Netting

Plastic netting shall be applied up and down slope and shall continue beyond the edge of the mulched area at least one foot at the sides, top, and bottom of the area.

At the top of the area, the netting shall be buried in a trench at least 6 inches deep.

Overlap: Sides of the rolls shall overlap at least 4 inches. Overlap the upper strip 3 feet over the lower strip and secure with stakes every 2 feet.

Staples, pins, or stakes shall be driven perpendicularly into the slope.

Secure the upper end with stakes every 2 feet. The sides of the rolls shall be secured with stakes spaced approximately 5 feet apart. Additionally, the center of each roll shall be secured down the center approximately every 5 feet.

Where the ends of the rolls overlap, secure with stakes approximately 2 feet apart.

Tackifier

The hydro-mulch material shall be applied uniformly over the straw in water slurry by hydroseeder within 48 hours following mulching. Unless otherwise specified on the Practice Requirements Sheet, the hydro-mulch shall be wood fiber mulch, a tackifier, and water at rates recommended by the manufacturer for the site conditions and intended purpose.

Application rates for wood fiber mulch products that have moisture contents greater than 15 percent shall be increased by the following factor, c:

$$c: = \frac{85 \text{ percent}}{\text{percent fiber (solids) in product}}$$

The hydroseeder shall be equipped with a built-in continuous agitation system of sufficient operating capacity to produce homogenous slurry and a discharge system, which will apply the slurry to the slopes at a continuous and uniform rate.

The materials shall not remain in the slurry longer than two (2) hours. Water used shall be potable water or Class 1 or 2 agricultural irrigation water.

The slurry shall be continuously mixed and shall be mixed for at least five (5) minutes after the last addition before application starts.

The slurry shall be applied uniformly over the site.

Mulching with Gravel

A gravel covering, with the size of the gravel specified on the Practice Requirements Sheet shall be distributed uniformly over the area at the rate specified on the Practice Requirements sheet. A fabric may be placed under the gravel.

Mats

Mats shall be applied as specified on the Practice Requirements Sheet. They will be anchored in a manner that will keep them in place.

Amendments for soil condition in organic systems

Amendments must be certified organic and be certified for N, P, and K content, and C:N ratio. These materials may be tilled. Adequate residue must be left to control erosion to T or less. A positive SCI rating for the field must be maintained.

Mulching with Other Materials

Other material(s) specified on the Practice Requirements Sheet shall be applied according to manufacturers specification or as described on the Practice Requirements Sheet.

VI. OTHER REQUIREMENTS

Operations shall be done in such a manner that soil erosion and air and water pollution are minimized and held within legal limits.

The owner, operator, contractor, and other persons shall conduct all work and operations in accordance with proper safety codes for the type of equipment and operations being performed with due regards to the safety of all persons and property.

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

MULCHING

(Ac.)

CODE 484

DEFINITION

Applying plant residues or other suitable materials produced off site, to the land surface.

PURPOSE

- Conserve soil moisture
- Moderate soil temperature
- Provide erosion control
- Suppress weed growth
- Facilitate the establishment of vegetative cover
- Improve soil condition
- Reduce airborne particulates

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all lands where mulches are needed. This practice may be used alone or in combination with other practices.

CRITERIA

General Criteria Applicable to All Purposes

The selection of mulching materials will depend primarily on site conditions and the material's availability. Mulch materials shall consist of natural and/or artificial materials that are environmentally safe such as plant residue, wood bark or chips, gravel, plastic, fabric, rice hulls, or other equivalent materials of sufficient dimension (depth or thickness) and durability to achieve the intended purpose for the required time period. Mulch derived from urban yard waste should be inspected for trash and other undesirable content.

Prior to mulching, the soil surface shall be prepared in order to achieve the desired purpose.

The mulch material shall be evenly applied and, if necessary, anchored to the soil. Tackifiers, emulsions, pinning, netting, crimping or other acceptable methods of anchoring will be used if needed to hold the mulch in place for specified periods.

As a minimum, manufactured mulches shall be applied according to the manufacturer's specifications. Remove plastic mulch from the site after it no longer meets the intended use. Do not incorporate plastic mulch into the soil. Recycle used plastic mulch when possible.

Mulching operations shall comply with federal, state and/or local laws and regulations during the installation, operation and maintenance of this practice.

Mulch material shall be relatively free of disease, pesticides, chemicals, noxious weed seeds, and other pests and pathogens.

When mulching orchards or vineyards, mulch should be placed a minimum of 6" from trunks.

Additional Criteria to Conserve Soil Moisture

Mulch materials applied to the soil surface shall provide at least 60 percent surface cover to reduce potential evaporation.

Apply mulch to soil wetted by irrigation. See Considerations for selecting mulch material.

To avoid plant disease when using plastic mulch, adjust irrigation to account for reduced water use and maintain desired soil moisture levels.

Additional Criteria to Moderate Soil Temperature

Mulch materials shall be selected and applied to obtain 100 percent coverage over the area treated. The material shall be of a significant thickness to persist for the period required for the temperature modification.

Additional Criteria to Provide Sheet and Rill Erosion Control

When mulching with cereal grain straw or grass hay, apply at a rate to achieve a minimum 70 percent ground cover. When mulching with wood products such as wood chips, bark, or shavings or other wood materials, apply a minimum 2-inch thickness. Mulch rate shall be determined using current erosion prediction technology to reach the soil erosion objective.

When mulching with gravel or other inorganic material apply a minimum 2 inch thickness and shall consist of pieces 0.75 to 2 inches in diameter.

Additional Criteria to Suppress Weed Growth

The thickness of mulch will be determined by the size of the plant being mulched. Mulches shall be kept clear of the stems of plants where disease is likely to occur. Mulches applied around growing plants or prior to weed seedling development shall have 100 percent ground cover, less unmulched area near plant stems. Thickness of the mulch shall be adequate to prevent emergence of targeted weeds. Plastic or other manufactured mulches may be used.

Additional Criteria to Establish Vegetative Cover

Mulch shall be applied at a rate that achieves a minimum of 70 percent ground cover to provide protection from erosion and runoff and yet allow adequate light and air penetration to the seedbed to ensure proper germination and emergence.

Additional Criteria to Improve Soil Condition

Apply mulch materials with a carbon to nitrogen ratio (C:N) less than 30 to 1 so that soil nitrogen is not immobilized by soil biota. Do not apply mulch with C:N less than 20:1 to an area of designed flow in watercourses.

Materials used for mulching to build soil fertility in organic production will be certified for nutrient content and as an organic soil amendment. When tillage is used for incorporation, predicted soil loss must be less than T and all operations will result in a positive Soil Conditioning Index value.

Use the Soil Conditioning Index to assess soil quality impacts and to determine the type and rate of the mulching material.

Additional Criteria to Reduce Airborne Particulate Matter from Wind Erosion

Mulch rate shall be determined using current wind erosion prediction technology to reach the soil erosion (movement of particulates offsite) objective.

CONSIDERATIONS

Evaluate the effects of mulching on evaporation, infiltration and runoff. Mulch material may affect microbial activity in the soil surface, increase infiltration, and decrease runoff, erosion and evaporation. The temperature of the surface runoff may also be lowered.

Uncomposted mulch from municipal sources may contain weed seeds and will require additional effort to monitor weed introductions.

Mulch material used to conserve soil moisture should be applied prior to moisture loss. Prior to mulching, ensure soil under shallow rooted crops is moist, as these crops require a constant supply of moisture.

Mulch may cause water retention near the soil surface, increasing risk of phytophthora root rot in shallow rooted crops such as avocado,

Mulch materials with a high water holding capacity and/or high impermeability to water droplets may adversely affect the water needs of plants.

Fine textured mulches (e.g. rice hulls) which allow less oxygen penetration than coarser materials should be no thicker than 1 or 2 inches.

Mulching may inhibit soil warming and increase risk of frost damage to sensitive crops.

Organic materials with C:N ratios of less than 20:1 will release nitrate-nitrogen which could cause water quality impairments.

Mulching may also provide habitat for beneficial insect and provide pest suppression.

UCCE has found 3” to 6” thick mulch effectively controls weeds in south coast orchards.

Coastal climates may be impractical for soil solarization with plastic mulch.

Clear and infra-red transmissible (IRT) plastics have the greatest warming potential. They are transparent to incoming radiation and trap the longer wavelengths radiating from the soil. Black mulches are limited to warming soils by conduction only and are less effective.

Clear mulches allow profuse weed growth and may negate the benefits of soil warming. Black mulches provide effective weed control. Wavelength selective (IRT) plastic provides the soil warming characteristics of clear mulch with the weed control ability of black mulch.

Low permeability mulches (e.g. Plastic) may increase concentrated flow and erosion on un-mulched areas.

Consider potential toxic alleleopathic effects that mulch material may have on other organisms. Animal and plant pest species may be incompatible with the site.

Consider the potential for increased pathogenic activity within the applied mulch material.

In extensive mulched areas that are habitat for ground nesting bees, provide appropriate access to the soil surface to allow for nesting.

Deep mulch provides nesting habitat for ground-burrowing rodents that can chew extensively on tree trunks and/or tree roots. Light mulch applied after the first cold weather may prevent rodents from nesting.

Some mulch material may adversely affect aquatic environments through changes in water chemistry or as waterborne debris. Consider placing mulch in locations that minimizes these risks.

Cultural Resources

NRCS policy is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice or associated practices in the plan could have an effect on cultural resources. The National Historic Preservation Act may require consultation with the California State Historic Preservation Officer.

http://www.nrcs.usda.gov/technical/cultural.html is the primary website for cultural resources information. The California Environmental Handbook and the California Environmental Assessment Worksheet also provide guidance on how the NRCS must account for cultural resources. The e-Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

Endangered Species

If during the Environmental Assessment NRCS determines that installation of this practice, along with any others proposed, will have an effect on any federal or state listed Rare, Threatened or Endangered species or their habitat, NRCS will advise the client of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the client selects one of the alternative conservation treatments for installation; or with concurrence of the client, NRCS initiates consultations concerning the listed species with the U.S. Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game.

PLANS AND SPECIFICATIONS

Specifications shall be prepared for each site and purpose and recorded using approved specification sheets, job sheets, technical notes, narrative statements in the conservation plan, or other acceptable documentation.

Documentation shall include:

- Purpose of the Mulch
- Type of mulch material used
- The percent cover and/or thickness of mulch material
- Timing of application
- Site preparation
- Listing of netting, tackifiers, or method of anchoring, and
- Operation and maintenance.

OPERATION AND MAINTENANCE

Mulched areas will be periodically inspected, and mulch shall be reinstalled or repaired as needed to accomplish the intended purpose.

Removal or incorporation of mulch materials shall be consistent with the intended purpose and site conditions. Remove plastic mulch from the field after use. When possible recycle used plastic mulch.

Operation of equipment near and on the site shall not compromise the intended purpose of the mulch.

Prevent or repair any fire damage to the mulch material.

Properly collect and dispose of artificial mulch material after intended use.

Monitor and control undesirable weeds in mulched areas.

REFERENCES

Agriculture and Agri-Food Canada. 2000. Plastic mulches for commercial vegetable production. Canada-Saskatchewan Irrigation Diversification Centre. Outlook, Saskatchewan.

Renard, K.G., G.R. Foster, G.A. Weesies, D.K. McCool, and D.C. Yoder, Coordinators. 1997. Predicting soil erosion by water: A guide to conservation planning with the Revised Universal Soil Loss Equation (RUSLE). U.S. Department of Agriculture, Agriculture Handbook No. 703.

Shaffer, M.J., and W.E. Larson (ed.). 1987. NTRM, a soil-crop simulation model for nitrogen, tillage and crop residue management. USDA Conserv. Res. Rep. 34-1. USDA-ARS.

Elmore, Clyde L., 1997, Soil Solarization: A Nonpesticidal Method for Controlling Diseases, Nematodes, and Weeds, UC pub #21377

Toy, T.J., and G.R. Foster. (Ed.) 1998. Guidelines for the use of the Revised Universal Soil Loss Equation (RUSLE) Version 1.06 on mined lands, construction sites, and reclaimed lands. USDI, OSMR.

USDA, NRCS. 2002. National Agronomy Manual. 190-V. Washington, D.C.

U.S DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
CALIFORNIA

PRACTICE REQUIREMENTS
for
587A - STRUCTURE FOR WATER CONTROL
CORRUGATED METAL PIPE

For: Business Name_____

Job Location_____

County_____ RCD_____ Farm/Tract No._____

Referral No._____Prepared By_____ Date_____

IT SHALL BE THE RESPONSIBILITY OF THE OWNER TO OBTAIN ALL NECESSARY PERMITS AND/OR RIGHTS, AND TO COMPLY WITH ALL ORDINANCES AND LAWS PERTAINING TO THIS INSTALLATION.

Installation shall be in accordance with the following drawings, specifications and special requirements. NO CHANGES ARE TO BE MADE IN THE DRAWINGS OR SPECIFICATIONS WITHOUT PRIOR APPROVAL OF THE NRCS TECHNICIAN.

1. Drawings, No._____ _____ _____

2. Practice Specifications_____587A___,_____,_____

3. Special Requirements:_____

_____

_____

_____

_____

_____

_____

4. Special Maintenance Requirements:_____

_____

_____

PRACTICE APPROVAL:

Job Classification: (Ref: Section 501 NEM)

Show the limiting elements for this job. This job is classified as, Class _____

Limiting elements:	Units
_____	_____
_____	_____
_____	_____
_____	_____

Design Approved by:_____ Date:_____

LANDOWNER'S/OPERATOR'S ACKNOWLEDGEMENT:

The landowner/operator acknowledges that:

a. He/she has received a copy of the drawings and specification, and that he/she has an understanding of the contents, and the requirements.

b. He/she has obtained all the necessary permits.

c. No changes will be made in the installation of the job without prior concurrence of the NRCS technician.

d. Maintenance of the installed work is necessary for proper performance during the project life.

Accepted by:_____ Date:_____

PRACTICE COMPLETION:

I have made an on site inspection of the site (or I am accepting owner/contractor documentation), and have determined that the job as installed does conform to the drawings and practice specifications.

Completion Certification by:

/s/_____ Date: _____

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

587A - STRUCTURE FOR WATER CONTROL CORRUGATED METAL PIPE

I. SCOPE

The work will consist of furnishing and placing of circular, arched or elliptical corrugated metal pipe and the necessary fittings to the lines, grades, and elevations as shown on the drawings.

II. MATERIALS

Pipe and fittings shall be of the size, shape, and kind of material shown on the drawings. Zinc-coated steel corrugated pipe and fittings and coatings shall conform to the requirements of ASTM Specification A-760 for the specified classes and shapes of pipe. Aluminum corrugated pipe and fittings and coatings shall conform to the requirements of ASTM B-745 for the specified classes and shapes of pipe.

III. EXCAVATION

Excavation for the conduit shall conform to the lines and grades shown on the drawings or as staked in the field, and as necessary for safe installation.

IV. INSTALLATION

The pipe shall be installed in accordance with the manufacturer's recommendations unless otherwise specified. Field welding of corrugated steel pipe will not be permitted. The pipe sections shall be joined with standard coupling bands unless otherwise specified. The pipe shall be firmly and uniformly bedded throughout its entire length. Backfill shall be accomplished in a manner that will not displace the pipe from the design grade or elevations shown on the drawings. Damaged coatings shall be repaired by acceptable methods.

V. WATER CONTROL GATES

Water control gates, when required, shall conform to the details shown on the drawings and shall be installed according to the manufacturer's recommendation.

VI. CONCRETE HEADWALLS OR OTHER CONCRETE APPURTENANT STRUCTURES.

Concrete headwalls or other concrete appurtenant structures shall conform to the details shown on the drawings and installed in accordance with Conservation Practice Specification 901, Concrete.

VII. BACKFILL

Backfill material shall contain no rocks greater than 2 inches. Compaction shall be accomplished by means of hand tamping or manually directed power tamper, or plate vibrators. Fill shall be placed in approximately horizontal layers. Fill shall be placed in layers not more than 4 inches thick before compaction, and in a manner which will prevent damage to the conduit. The height of the fill adjacent to the conduit shall be increased at approximately the same rate on all sides. Water shall be added to the fill material, if necessary, to obtain the proper moisture for compaction; the material shall retain a ball shape when squeezed in the hand.

VIII. VEGETATIVE COVER

Unless otherwise specified, a protective cover of vegetation shall be established on the disturbed area. The planting of vegetative materials shall conform to the requirements of Practice Specification 342, Critical Area Planting.

IX. SPECIAL MEASURES

Measures and construction methods shall be incorporated as needed and practical that enhance fish and wildlife values. Special attention shall be given to protecting visual resources and maintaining key shade, food and den trees.

X. CONSTRUCTION OPERATIONS

Construction operations shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits. The owner, operator, Contractor or other persons will conduct all work and operations in accordance with proper safety codes for the type of construction being performed with due regards to the safety of all persons and property.

The completed job shall be workmanlike and present a good appearance.

XI. OPERATION AND MAINTENANCE ITEMS

A properly operated and maintained structure for water control is an asset to your farm. This structure was designed and installed to safely convey water at a condition that will prevent erosion. The estimated life span of this system is at least 10 years. The life of this system can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic operation and maintenance to maintain satisfactory performance. Here are some recommendations to help you develop a good operations and maintenance program.

All fences, railings, and/or warning signs shall be maintained to provide warning and/or prevent unauthorized human or livestock entry.

Maintain vigorous growth of vegetative coverings. This includes reseeding, fertilization and application of herbicides when necessary. Periodic mowing may also be needed to control height.

Remove any debris that may accumulate on or in the immediate area of the structure.

Make sure that all structural drains are functional.

Settlement or cracks in the soil weaken earthen sections and may accelerate the development of flow paths which may result in structure failure. This should be investigated to deter mine the cause and immediately repaired.

Check concrete surfaces for accelerated weathering, spalling, settlement, alignment or cracks.

Check metal surfaces for rust and other damage, especially sections in contact with earthfill and with other materials. Repair or replace damaged section and apply paint as protective covering.

Inspect the structure and immediate vicinity for damage from rodents or burrowing animals. Repair any damage. Take appropriate corrective actions to alleviate further damage.

Immediately repair any vandalism, vehicular, or livestock damage to the structure, and any appurtenances.

Other items specific to your project are listed on the "Practice Requirement" sheet.

U.S DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
CALIFORNIA

PRACTICE REQUIREMENTS
for
587B - STRUCTURE FOR WATER CONTROL
PLASTIC PIPE CULVERTS

For: Business Name_____

Job Location_____

County_____ RCD_____ Farm/Tract No._____

Referral No._____Prepared By_____ Date_____

IT SHALL BE THE RESPONSIBILITY OF THE OWNER TO OBTAIN ALL NECESSARY PERMITS AND/OR RIGHTS, AND TO COMPLY WITH ALL ORDINANCES AND LAWS PERTAINING TO THIS INSTALLATION.

Installation shall be in accordance with the following drawings, specifications and special requirements. NO CHANGES ARE TO BE MADE IN THE DRAWINGS OR SPECIFICATIONS WITHOUT PRIOR APPROVAL OF THE NRCS TECHNICIAN.

1. Drawings, No._____ _____ _____

2. Practice Specifications_____587B___,_____,_____

3. Special Requirements:_____

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_____

_____

4. Special Maintenance Requirements:_____

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_____

PRACTICE APPROVAL:

Job Classification: (Ref: Section 501 NEM)

Show the limiting elements for this job. This job is classified as, Class _____

Limiting elements:	Units
_____	_____
_____	_____
_____	_____
_____	_____

Design Approved by:_____ Date:_____

LANDOWNER'S/OPERATOR'S ACKNOWLEDGEMENT:

The landowner/operator acknowledges that:

a. He/she has received a copy of the drawings and specification, and that he/she has an understanding of the contents, and the requirements.

b. He/she has obtained all the necessary permits.

c. No changes will be made in the installation of the job without prior concurrence of the NRCS technician.

d. Maintenance of the installed work is necessary for proper performance during the project life.

Accepted by:_____ Date:_____

PRACTICE COMPLETION:

I have made an on site inspection of the site (or I am accepting owner/contractor documentation), and have determined that the job as installed does conform to the drawings and practice specifications.

Completion Certification by:

/s/_____ Date: _____

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

587B - STRUCTURE FOR WATER CONTROL PLASTIC PIPE CULVERTS

I. SCOPE

The work will consist of furnishing and placing plastic pipe for culverts, with the necessary fittings at the location, and to the lines and grades as shown on the drawings, and shall include any necessary excavation and the required structural support.

II. GENERAL

Pipe and fittings shall be of the size, shape, and kind of material as shown on the drawings.

The Installer shall provide the Engineer with a Certificate of Compliance from the manufacturer for each type of plastic pipe furnished. Said certificate shall certify that the plastic pipe complies with the requirements of the specifications, and shall include the resin material cell classification, unit weight of pipe, average pipe stiffness and the date of manufacture.

The dimensions given for the pipe are nominal inside diameters from which the average inside diameter shall not vary more than-the amount specified for in the ASTM or ASSHTO specification for the different types of pipe

III. MATERIALS

The pipe used shall be listed on the "Practice Requirements" sheet. Prior to purchase of the pipe, the owner should provide the Engineer with the name of the pipe manufacturer and the markings on the pipe for the Engineer's determination of acceptance. The quality of the pipe shall conform to the requirements of one of the following type of pipe:

ASSHTO M 294-01, Corrugated Polyethylene Pipe. The pipe shall be Type C (full circular cross section, with a corrugated surface both inside and outside; or Type S, (full circular cross section, with an outer corrugated pipe wall and a smooth inner liner). Corrugations shall be annular.

ASTM F949, Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe and fittings. The pipe shall be full circular cross section, with an outer corrugated pipe wall and a smooth inner liner. Pipe stiffness shall be 46 psi.

ASTM F679, Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings. The pipe shall conform to all the requirements of ASTM Designation F 679. Pipe stiffness shall be 46 psi

ASTM F794, Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based On Controlled Inside Diameter. The pipe shall conform to all the requirements of ASTM Designation F 794. Pipe stiffness shall be 46 psi

IV. CONTROL OF WATER

Do not lay or embed pipe in standing or running water. At all times prevent runoff and surface water from entering the trench. Maintain water level below pipe bedding and foundation to provide a stable trench bottom.

De-watering shall meet the requirements of 909 Control of Water. De-watering should continue through-out the pipe laying operation until sufficient cover is placed over the pipe so that it will not float.

V. TRENCH EXCAVATION

All necessary excavation shall be to the limits required to place the pipe to grade. Any trench excavations greater than 4 feet in depth shall be supported as necessary to safeguard the work and workmen.

Where trench walls are stable or supported, provide a minimum trench width sufficient, but no greater than necessary, to ensure working room to properly and safely compact haunching and other embedment materials. The space between the pipe and the trench wall must be larger than the compaction equipment used in the pipe zone. The minimum trench width shall be not less than 1.25 times the outer diameter plus 12 inches.

LAYING AND BEDDING THE PIPE

The installer shall furnish such equipment as is necessary to place the pipe without damaging the pipe. The pipe shall be transported and handled in such a manner as to prevent bending or crushing.

Unless otherwise specified, the pipe shall be installed and the pipe sections shall be joined in accordance with the manufacturer's recommendations.

The pipe shall be firmly and uniformly bedded throughout it entire length to the depth specified on the drawings. Provide a minimum of 4 inches of bedding unless otherwise specified. When rock or unyielding material is present in the trench bottom, install a minimum of 6 inches of bedding below the bottom of the pipe. Where the trench bottom is unstable or shows a "quick" tendency, excavate to a depth as required by the engineer and replace with Class IB or Class II material. If the trench sidewalls slough off during excavation or pipe installation, remove all sloughed or loose material from the trench.

After the grade line has been checked for proper elevation, the pipe shall be loaded sufficiently to prevent its being lifted from the bedding during backfilling.

Deflection of pipe diameter (in the vertical direction) shall be controlled by strutting or other methods. Pipe with bell and spigot shall be placed with the bell upstream. Bell holes shall be excavated to allow the pipe to rest firmly on the bedding. All work shall be carried out in the dry and stable conditions.

Pressure testing: When specified, the pipeline shall be tested for leakage by subjecting the pipeline to a water pressure equal to the design working head. All locations of joints and connections shall be open from backfill during testing. However, some backfill may be placed in the mid-sections of the pipe for the purpose to hold the pipe in place while testing. After testing any leaks shall be repaired, and the line tested again. After the leaks have been satisfied, the backfill can be completed.

VI. STRUCTURAL BACKFILL

All necessary excavation shall be to the limits required to place the pipe to grade. Any trench excavations greater than 4 feet in depth shall be supported as necessary to safeguard the work and workmen.

Structural backfill shall consist of one of the following classes of backfill (ASTM D2321) which is as shown on the drawings:

Class 1B - The material shall conform to the following gradation:

Sieve Size	Percent Passing Sieve Size
1 1/2 inch	100
No. 4	≤ 50
No. 200	≤ 5

The material is to be placed in layers of not more than 6 inches and the relative density of each layer shall not be less than 85 percent of the maximum laboratory compaction at optimum moisture in accordance with ASTM D-698.

Class II- On-site material (GW, GP, SW, and SP) - Backfill material shall be of the material from on-site excavation and shall be compacted to a minimum density 85 percent of the maximum laboratory compaction at optimum moisture in accordance with ASTM D-698.

Class III - On-site material (GM, GC, SM, and SC) - Backfill material shall be of the material from on-site excavation and shall be compacted to 90 percent of the maximum laboratory compaction at optimum moisture in accordance with ASTM D-698.

Cement Slurry Backfill may consist of a fluid, workable mixture of aggregate, cement and water. The aggregate shall be Class II backfill material.
The mixture shall contain a minimum of 2 bags of Portland cement per cubic yard of slurry, and only sufficient water to produce a workable mix that will flow and can be pumped without segregation of the aggregate while being placed.

The slurry is to be allowed to cure in place for 12 hours before proceeding with other construction operations.

Backfill material shall contain no rocks greater than 1 1/2 inches. Compaction shall be accomplished by means of hand tamping or manually directed power tamper, or plate vibrators. Fill shall be placed in approximately horizontal layers not more than 6 inches thick before compaction, and in a manner which will prevent damage to the conduit. The height of the fill adjacent to the conduit shall be increased at approximately the same rate on all sides. Water shall be added to the fill material, if necessary, to obtain the proper moisture for compaction; the material shall retain a ball shape when squeezed in the hand.

The initial backfill shall extend to a minimum of 12 inches above the top of the pipe before using mechanical compactors. The final backfill shall be placed in layers, not exceeding 8 inches and compacted, and is to extend upward to the natural ground surface or the limits as shown on the drawings. Heavy motorized equipment shall not be permitted for compacting backfill.

VIII MINIMUM COVER

To prevent damage to the pipe and disturbance to the embedment, a minimum depth of cover should be installed before allowing vehicles or heavy equipment to cross the pipe trench. Provide a minimum cover of 24 inches or one pipe diameter (whichever is larger) over Class IB embedment and 36 inches for Class II and III embedment.

1X CONCRETE HEADWALLS OR OTHER CONCRETE APPURTENANT STRUCTURES.

Concrete headwalls or other concrete appurtenant structures shall conform to the details shown on the drawings and installed in accordance with Conservation Practice Specification 901, Concrete.

X WATER CONTROL GATES

Water control gates, when required, shall conform to the details shown on the drawings and shall be installed according to the manufacturer's recommendation.

XI VEGETATIVE COVER

Unless otherwise specified, a protective cover of vegetation shall be established on the disturbed area. The planting of vegetative materials shall conform to the requirements of Practice Specification 342, Critical Area Planting.

XII SPECIAL MEASURES

Measures and construction methods shall be incorporated as needed and practical that enhance fish and wildlife values. Special attention shall be given to protecting visual resources and maintaining key shade, food and den trees.

X11I CONSTRUCTION OPERATIONS

Construction operations shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits. The owner, operator, Contractor or other persons will conduct all work and operations in accordance with proper safety codes for the type of construction being performed with due regards to the safety of all persons and property.

The completed job shall be workmanlike and present a good appearance.

OPERATION AND MAINTENANCE ITEMS

A properly operated and maintained structure for water control is an asset to your farm. This structure was designed and installed to safely convey water at a condition that will prevent erosion. The estimated life span of this system is at least 10 years. The life of this system can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic operation and maintenance to maintain satisfactory performance. Here are some recommendations to help you develop a good operations and maintenance program.

All fences, railings, and/or warning signs shall be maintained to provide warning and/or prevent unauthorized human or livestock entry.

Maintain vigorous growth of vegetative coverings. This includes reseeding, fertilization and application of herbicides when necessary. Periodic mowing may also be needed to control height.

Remove any debris that may accumulate on or in the immediate area of the structure.

Settlement or cracks in the soil weaken earthen sections and may accelerate the development of flow paths that may result in structure failure. This should be investigated to determine the cause and immediately repaired.

Check metal surfaces for rust and other damage, especially sections in contact with earthfill and with other materials. Repair or replace damaged section and apply paint as protective covering.

Inspect the structure and immediate vicinity for damage from rodents or burrowing animals. Repair any damage. Take appropriate corrective actions to alleviate further damage.

Immediately repair any vandalism, vehicular, or livestock damage to the structure, and any appurtenances.

Other items specific to your project are listed on the "Practice Requirement" sheet.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

587C - STRUCTURE FOR WATER CONTROL FISH SCREEN

I. SCOPE

The work will consist of furnishing and installing a fish screening system to prevent fish, trash and debris from entering the irrigation delivery system. The work will include all the necessary work and fittings installed to the lines, grades and elevations as shown on the drawings.

II. MATERIALS

Pipe and fittings shall conform to the Practice Standard 430 appropriate to the pipe material.

Concrete used in the installation shall conform to the NRCS Construction Specification 901 Concrete.

Earthfill shall conform to the NRCS Construction Specification 903 Earthfill.

Rock riprap shall conform to the NRCS Construction Specification 907 Rock Riprap.

Grouted Rock Riprap shall conform to NRCS Construction Specification 908 Rock Riprap (Grouted).

Geotextile Fabrics shall conform to NRCS Construction Specification 905 Geotextile Fabric.

III. EXCAVATION

Excavation for the installation shall conform to the lines and grades shown on the drawings or as staked in the field, and as necessary for safe installation.

IV. INSTALLATION

Pumped diversions, which are screened using manufactured, self-contained screens, shall be installed in accordance with the manufacturer's recommendations unless otherwise specified. Minimum clearance of one screen diameter from the channel invert and minimum submergence of one screen diameter from the water surface is required. Installation of all other screens shall be as shown on the drawings.

Pipe shall be shop or field fabricated as needed. Field welding of galvanized corrugated metal pipe will not be permitted. Pipe sections shall be joined with flanged fittings or coupling bands unless otherwise specified. Pipe shall be bedded or supported as shown on the drawings.

V. WATER CONTROL GATES

Water control gates, when required, shall conform to the details shown on the drawings and shall be installed according to the manufacturer's recommendation.

VI. BACKFILL

Backfill material shall contain no rocks greater than 2 inches. Compaction shall be accomplished by means of hand tamping or manually directed power tamper, or plate vibrators. Fill shall be placed in approximately horizontal layers. Fill shall be placed in layers not more than 4 inches thick before compaction, and in a manner which will prevent damage to the conduit. The height of the fill adjacent to the conduit shall be increased at approximately the same rate on all sides. Water shall be added to the fill material, if necessary, to obtain the proper moisture for compaction; the material shall retain a ball shape when squeezed in the hand.

VII. VEGETATIVE COVER

Unless otherwise specified, a protective cover of vegetation shall be established on the disturbed area. The planting of vegetative materials shall conform to the requirements of Practice Specification 342, Critical Area Planting.

VIII. SPECIAL MEASURES

Measures and construction methods shall be incorporated, as needed and practical, that enhance fish and wildlife values while minimizing disturbances to instream and riparian habitats. Special attention shall be given to protecting visual resources as well as the physical characteristics of the streambank, streambed and surrounding vegetation.

IX. CONSTRUCTION OPERATIONS

Construction operations shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits. The owner, operator, Contractor or other persons will conduct all work and operations in accordance with proper safety codes for the type of construction being performed with due regards to the safety of all persons and property.

The completed job shall be workmanlike and present a good appearance.

OPERATION AND MAINTENANCE ITEMS

A properly operated and maintained fish screen is an asset to your farm. This structure was designed and installed to safely convey water in a manner that will prevent entraining anadromous fish in your irrigation system. Lack of attention to operation and maintenance details has the potential to kill significant numbers of fish that the screen has been designed to protect.

The estimated life span of this system is at least 10 years. The life of this system can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic operation and maintenance to maintain satisfactory performance. Here are some recommendations to help you develop a good operations and maintenance program.

Pumped diversions:

Before start of irrigation season, remove, clean and inspect screens for damage, corrosion, and service rotating components as recommended by the manufacturer. Repair or replace damaged screens or hardware components.

Inspect backwash pump system and pressure gauge for proper operation. Pressure shall be within the specified pressure range. Spray nozzles shall be inspected for plugging or debris and replaced if excessive wear is noted. Check to see that the interlock with the main pumping plant is functional so that the backwash pump cannot be inadvertently turned off. Replace pressure gauges if non-functional.

Inspect inline filters or sand separators. Repair and/or replace if non-functional.

Remove any debris and silt bars that may have accumulated and check depth of water below screen to assure one screen radius clearance from the bottom.

Remove any aquatic weeds that may interfere with rotation of screens or cause debris to accumulate.

Install and maintain fish screen warning signs to notify boaters and fisherman of submerged obstacle.

Inspect all working platforms, fences and railings for safety and post warning signs to prevent unauthorized entry.

During pump operation monitor backwash pressure or install automatic pump safety shutoff switch.

If variations in irrigation pump supply or debris accumulation on screen are noted, discontinue pumping. Do not resume pumping until the difficulty has been located and corrected.

Non-pumped Diversions:

The screen should be visited as frequently as environmental conditions dictate. If the river level or diversion flow changes, steps must be taken to ensure that the screen is properly submerged for the amount of flow being diverted. Bypass flows may also need to be adjusted.

Dealing with debris at a screen site needs to be addressed on a frequent basis as debris accumulation can cause significant injury to fish. Debris type and quantity vary seasonally so a suitable schedule should be developed.

Remove any debris that may accumulate on or in the immediate area of the structure. Remove debris from bypass downwells, bypass entrances and exits, trash racks and along the screen face.

Components must be greased (with environmentally benign grease) on a regular basis. Screen seals must be checked frequently for wear and replaced as needed. Sediment should be removed before it starts passing through the seals.

All screens:

All fences, railings, and/or warning signs shall be maintained to provide warning and/or prevent unauthorized human or livestock entry.

Maintain vigorous growth of vegetative coverings. This includes reseeding, fertilization and application of herbicides when necessary. Periodic mowing may also be needed to control height.

Compacted earthfill shall be inspected for destructive rodent holes, and repaired as necessary.

Make sure that all structural drains are functional.

Settlement or cracks in the soil weaken earthen sections and may accelerate the development of flow paths that may result in structure failure. This should be investigated to determine the cause and immediately repaired.

Check concrete surfaces for accelerated weathering, spelling, settlement, alignment or cracks.

Check metal surfaces for rust and other damage, especially sections in contact with earthfill and with other materials. Repair or replace damaged section and apply paint as protective covering.

Inspect for damage from rodents or burrowing animals. Repair any damage. Take appropriate corrective actions to alleviate further damage.

Immediately repair any vandalism, 'vehicular, or livestock damage to the structure, and any appurtenances.

Other items specific to your project are listed on the "Practice Requirement" sheet.

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

587C – STRUCTURE FOR WATER CONTROL

FISH SCREEN

OPERATION AND MAINTENANCE

Sponsor/Land user: _____ Date: _____

Address: _____

_____

Location GPS Coordinates Map Datum: _____ E _____ N _____

Quad Sheet Name _____ SEC _____ T _____ R _____

A properly operated and maintained fish screen is an asset to your farm. This structure was designed and installed to safely convey water in a manner that will prevent entraining anadromous fish in your irrigation system. Lack of attention to operation and maintenance details has the potential to kill significant numbers of fish that the screen has been designed to protect.

The estimated life span of this system is at least 20 years. The life of this system can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic operation and maintenance to maintain satisfactory performance. Here are some recommendations to help you develop a good operations and maintenance program.

GENERAL RECOMMENDATIONS

- All fences, railings, and/or warning signs shall be maintained to provide warning and/or prevent unauthorized human or livestock entry.
- Maintain vigorous growth of desirable vegetative coverings. This includes reseeding, fertilization, and controlled application of herbicides when necessary. Periodic mowing may also be needed to control height.
- Remove any debris that may accumulate on or in the immediate area of the structure.
- Make sure that all structural drains are functional.
- Determine and eliminate causes of settlement or cracks in the earthen sections and repair damage.
- Repair spalls, cracks and weathered areas in concrete surfaces.
- Repair or replace rusted or damaged metal and apply paint as a protective coating.
- Check all valves, gates and other appurtenances for proper functioning. If worn or damaged, repair or replace following the manufacturer's recommendations.

- Replace weathered or displaced rock riprap to constructed grade.
- Check all timber or lumber sections for decay and other damage, especially sections in contact with earth or other materials. Repair damaged sections and apply protective coatings as needed.
- Inspect for damage from rodents or burrowing animals. Repair any damage. Take appropriate corrective actions to alleviate further damage.
- Immediately repair any vandalism, vehicular, or livestock damage to any earthfills, spillways, or outlets or other apparatuses.

PUMPED DIVERSIONS:

- Before start of irrigation season, remove, clean and inspect screens for damage, corrosion, and service rotating components as recommended by the manufacturer. Repair or replace damaged screens or hardware components.
- Inspect backwash pump system and pressure gauge for proper operation. Pressure shall be within the specified pressure range. Spray nozzles shall be inspected for plugging or debris and replaced if excessive wear is noted. Check to see that the interlock with the main pumping plant is functional so that the backwash pump cannot be inadvertently turned off. Replace pressure gauges if non-functional.
- Inspect inline filters or sand separators. Repair and/or replace if non-functional.
- Remove any debris and silt bars that may have accumulated and check depth of water below screen to assure one screen radius clearance from the bottom.
- Remove any aquatic weeds that may interfere with rotation of screens or cause debris to accumulate.
- Install and maintain fish screen warning signs to notify boaters and fisherman of submerged obstacle.
- Inspect all working platforms, fences and railings for safety and post warning signs to prevent unauthorized entry.
- During pump operation monitor backwash pressure or install automatic pump safety shutoff switch.
- If variations in irrigation pump supply or debris accumulation on screen are noted, discontinue pumping. Do not resume pumping until the difficulty has been located and corrected.

NON-PUMPED DIVERSIONS:

- The screen should be visited as frequently as environmental conditions dictate. If the river level or diversion flow changes, steps must be taken to ensure that the screen is properly submerged for the amount of flow being diverted. Bypass flows may also need to be adjusted.
- Dealing with debris at a screen site needs to be addressed on a frequent basis as debris accumulation can cause significant injury to fish. Debris type and quantity vary seasonally so a suitable schedule should be developed.
- Remove any debris that may accumulate on or in the immediate area of the structure. Remove debris from bypass downwells, bypass entrances and exits, trash racks and along the screen face.

- Components must be greased (with environmentally benign grease) on a regular basis. Screen seals must be checked frequently for wear and replaced as needed. Sediment should be removed before it starts passing through the seals.

SPECIFIC RECOMMENDATIONS FOR YOUR FISH SCREEN

CONTACT YOUR LOCAL NATURAL RESOURCES CONSERVATION SERVICE OFFICE FOR ANY ADDITIONAL TECHNICAL ASSISTANCE YOU MIGHT NEED FOR IMPLEMENTATION OF THIS OPERATION AND MAINTENANCE PLAN FOR YOUR FISH SCREEN.

U.S DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
CALIFORNIA

PRACTICE REQUIREMENTS
for
587C - STRUCTURE FOR WATER CONTROL
FISH SCREEN

For: Business Name_____

Job Location_____

County_____ RCD_____ Farm/Tract No._____

Referral No._____Prepared By_____ Date_____

IT SHALL BE THE RESPONSIBILITY OF THE OWNER TO OBTAIN ALL NECESSARY PERMITS AND/OR RIGHTS, AND TO COMPLY WITH ALL ORDINANCES AND LAWS PERTAINING TO THIS INSTALLATION.

Installation shall be in accordance with the following drawings, specifications and special requirements. NO CHANGES ARE TO BE MADE IN THE DRAWINGS OR SPECIFICATIONS WITHOUT PRIOR APPROVAL OF THE NRCS TECHNICIAN.

1. Drawings, No._____ _____ _____

2. Practice Specifications_____587C___,_____,_____

3. Special Requirements:_____

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_____

4. Special Maintenance Requirements:_____

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_____

PRACTICE APPROVAL:

Job Classification: (Ref: Section 501 NEM)

Show the limiting elements for this job. This job is classified as, Class _____

Limiting elements:	Units
_____	_____
_____	_____
_____	_____
_____	_____

Design Approved by:_____ Date:_____

LANDOWNER'S/OPERATOR'S ACKNOWLEDGEMENT:

The landowner/operator acknowledges that:

a. He/she has received a copy of the drawings and specification, and that he/she has an understanding of the contents, and the requirements.

b. He/she has obtained all the necessary permits.

c. No changes will be made in the installation of the job without prior concurrence of the NRCS technician.

d. Maintenance of the installed work is necessary for proper performance during the project life.

Accepted by:_____ Date:_____

PRACTICE COMPLETION:

I have made an on site inspection of the site (or I am accepting owner/contractor documentation), and have determined that the job as installed does conform to the drawings and practice specifications.

Completion Certification by:

/s/_____ Date: _____

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

587D – STRUCTURE FOR WATER CONTROL

RUSSIAN RIVER PILOT – WIND MACHINE

OPERATION AND MAINTENANCE

Sponsor/Land user: _____ Date: _____

Address: _____

_____

Location GPS Coordinates Map Datum: _____ E _____ N _____

Quad Sheet Name _____ SEC _____ T _____ R _____

A properly operated and maintained wind machine is an asset to your farm. This structure was designed and installed for frost protection. The estimated life span of this system is at least 10 years. The life of this system can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic operation and maintenance to maintain satisfactory performance. Additional permits may be required to perform this work. Here are some recommendations to help you develop a good operation and maintenance program.

GENERAL RECOMMENDATIONS

- All fences, railings, and/or warning signs shall be maintained to provide warning and/or prevent unauthorized human or livestock entry.
- Maintain vigorous growth of desirable vegetative coverings. This includes reseeding, fertilization, and controlled application of herbicides when necessary. Periodic mowing may also be needed to control height.
- Remove any debris that may accumulate on or in the immediate area of the structure.
- Repair spalls, cracks and weathered areas in concrete surfaces.
- Repair or replace rusted or damaged metal and apply paint as a protective coating.
- Check all valves, gates and other appurtenances for proper functioning. If worn or damaged, repair or replace following the manufacturer's recommendations.
- Immediately repair any vandalism, vehicular, or livestock damage to any part of the structure.

SPECIFIC RECOMMENDATIONS FOR YOUR RUSSIAN RIVER PILOT WIND MACHINE

Tower Type Wind Machines:

Wind machines are not effective for protection of crops affected by advection freezes.

Use of tower wind machine during an advection frost can cause more damage to crops than no protection (tower wind machine would be taking cold air and pushing down on crops).

Use of tower wind machines should be evaluated when wind speed exceeds approximately 5.6 mph.

Operation and maintenance shall follow the manufacturer's recommendations.

Tower-less Wind Machines:

Operation and maintenance shall also follow the manufacturer's recommendations.

Consider storage when unit is not in use.

CONTACT YOUR LOCAL NATURAL RESOURCES CONSERVATION SERVICE OFFICE FOR ANY ADDITIONAL TECHNICAL ASSISTANCE YOU MIGHT NEED FOR IMPLEMENTATION OF THIS OPERATION AND MAINTENANCE PLAN FOR YOUR WIND MACHINE.

U.S DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
CALIFORNIA

PRACTICE REQUIREMENTS
for
587D - STRUCTURE FOR WATER CONTROL
RUSSIAN RIVER PILOT- WIND MACHINE

For: Business Name_____

Job Location_____

County_____ RCD_____ Farm/Tract No._____

Referral No._____Prepared By_____ Date_____

IT SHALL BE THE RESPONSIBILITY OF THE OWNER TO OBTAIN ALL NECESSARY PERMITS AND/OR RIGHTS, AND TO COMPLY WITH ALL ORDINANCES AND LAWS PERTAINING TO THIS INSTALLATION.

Installation shall be in accordance with the following drawings, specifications and special requirements. NO CHANGES ARE TO BE MADE IN THE DRAWINGS OR SPECIFICATIONS WITHOUT PRIOR APPROVAL OF THE NRCS TECHNICIAN.

1. Drawings, No._____ _____ _____

2. Practice Specifications_____587D___,_____,_____

3. Special Requirements:_____

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4. Special Maintenance Requirements:_____

_____

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PRACTICE APPROVAL:

Job Classification: (Ref: Section 501 NEM)

Show the limiting elements for this job. This job is classified as, Class ___V_____

Limiting elements:	Units
_____	_____
_____	_____
_____	_____
_____	_____

Design Approved by:_____ Date:_____

LANDOWNER'S/OPERATOR'S ACKNOWLEDGEMENT:

The landowner/operator acknowledges that:

a. He/she has received a copy of the drawings and specification, and that he/she has an understanding of the contents, and the requirements.

b. He/she has obtained all the necessary permits.

c. No changes will be made in the installation of the job without prior concurrence of the NRCS technician.

d. Maintenance of the installed work is necessary for proper performance during the project life.

Accepted by:_____ Date:_____

PRACTICE COMPLETION:

I have made an on site inspection of the site (or I am accepting owner/contractor documentation), and have determined that the job as installed does conform to the drawings and practice specifications.

Completion Certification by:

/s/_____ Date: _____

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

587D - STRUCTURE FOR WATER CONTROL

RUSSIAN RIVER PILOT

I. SCOPE

The work shall consist of furnishing and installing a wind machine for frost protection in accordance with the manufacturer's recommendation at the location as shown on the drawings.

Wind machines apply only where their use minimizes the need to pump water from the stream for frost control and a Frost Protection Plan has been approved.

II. SUBMITTALS

The following items are to be submitted for review and approval prior to installation of the wind machine:

1. Design Report addressing criteria and considerations shown in Sections III and IV.
2. Frost Protection Plan;
3. Equipment and Materials list;
4. Construction drawings and specifications; and
5. Procedures for Operation and Maintenance.

III. CRITERIA FOR WIND MACHINES

Pumping of water out of streams for frost control can lead to dewatering of these reaches and detrimentally affect aquatic species.

In some applications, wind machines can be an effective alternative to pumping water for frost protection during a radiation freeze. Radiation freezes are characterized by clear skies, calm winds, and temperature inversions. Radiation frosts occur because of heat losses in the form of radiant energy. Under clear, nighttime skies, more heat is radiated away from an orchard than it receives, so the temperature drops. The temperature falls faster near the radiating surface causing a temperature inversion.

Wind machines are not effective for protection of crops affected by advection freezes. An advection frost occurs when cold air blows into an area to replace warmer air that was present before the weather change. It is associated with moderate to strong winds, no temperature inversion, and low humidity.

A Frost Protection Plan shall be developed. The plan shall include the climate history, frost damage patterns, crop requirements, appropriate siting, density of machines, power source options and requirements, and any local requirements. The plan shall address operation of the wind machine to manage frost protection in all climatic conditions. It shall also address conditions when water can be pumped from the stream to assist in frost protection during times when the wind machine does not provide adequate protection.

Wind machines shall not be installed within 200 feet of woody vegetation that may provide suitable habitat for birds that are nesting, resting, or using such vegetation for protection from the cold weather. Exceptions to this distance may be given by NRCS biologists after the site has been accessed for any potential impacts.

Tower Wind Machine (for frost protection) – The area protected by one tower wind machine depends on local topography and microclimate patterns. A general rule is one tower machine can be used for 10 acres with an inversion layer of height 50 ft and temperature differential of 10°F. For variable terrain, the blades of tower wind machine heads can be contoured and the tilt angle adjusted according to site-specific conditions.

The structural components of tower wind machines shall be designed by a registered Civil Engineer, Structural Engineer or Architect, licensed to practice in California, to meet all state, county and local building codes. The wind machine shall be suitable for the site and designed to meet all site-specific requirements. NRCS shall provide the designer with a detailed site map (showing all planned practices), a detailed topographical map and NRCS Soil Survey information.

The engineer or architect shall provide construction plans, specifications and operation and maintenance guidance for the tower wind machines.

The design shall consider all anticipated loads, including live loads, dead loads, wind, snow, ice and seismic loads that influence the performance of the structure, material properties and construction quality. Design assumptions and construction requirements shall be indicated on the drawings.

The plans, including the foundation work, shall be signed and sealed by a registered Civil Engineer, Structural Engineer or Architect.

Tower-less Wind Machines (for frost protection) – Wind machines that that do not include structural components are designed in accordance with the manufacturer's recommendations. Placement of the tower-less wind machines is critical to successful frost protection. These machines must be placed in the coldest spot of a depression. The tower-less wind machine shall be suitable for the site and designed to meet all site-specific requirements. NRCS shall provide the designer with a detailed site map (showing all planned practices), a detailed topographical map and NRCS Soil Survey information.

IV. CONSIDERATIONS

Rapid drawdown of the stream is a threat to species survival and recovery. The effects from pumping for frost control are more extreme in drought years.

Wind machines are not the only alternative for frost protection that allows water to remain in the streams. Consider other types of frost protection and management techniques that will aid in frost control while not causing drawdown of the stream.

While intending to enhance conditions for fish and other aquatic species, there is potential to directly or indirectly have adverse impacts to birds, mammals, amphibian and/or reptiles that may be using cover in or near fields with wind machines. Noise produced when machines are in use may significantly disturb terrestrial species behavior.

Operation of tower wind machines during an advection frost can cause more damage to crops than no protection (tower wind machine would move cold air onto crops.)

Wind machines equipped with internal combustion engines may be sources of particulate matter emissions (PM10 and PM2.5), which can degrade local air quality. In addition, the California Air Resources Board has designated diesel exhaust emissions as a toxic air contaminant. Utilizing cleaner burning engines, such as propane-fueled engines, will significantly reduce particulate emissions. Electric-powered wind machines emit no air pollution at the source.

V. SITE PREPARATION (where required)

Clearing and disposal methods shall be in accordance with applicable state and county laws with due regard to the safety of persons and property.

Excess material shall be wasted at locations noted on the drawings or as staked in the field.

VI. CONCRETE (when specified)

Concrete shall conform to the requirements of Construction Specification 900 - Concrete (3000 psi).

VII. INSTALLATION

Installation of the unit shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits. The owner, operator, Contractor or other persons will conduct all work and operations in accordance with proper safety codes for the type of construction being performed with due regard to the safety of all persons and property.

VIII. VEGETATIVE COVER (where required)

The planting of vegetative materials, if specified, shall conform to the requirements of Conservation Practice Specification 342-Critical Area Planting.

IX. ASSOCIATED CONSERVATION PRACTICES (where required)

Installation of associated conservation practices shall be as shown on the drawings, and shall be installed in accordance with the appropriate NRCS Conservation Practice Specification.

X. BASIS OF ACCEPTANCE

The acceptability of the wind machine shall be determined by inspection to check:

- Submittals are reviewed and approved by NRCS prior to installation of practice measures.
- The wind machine is installed; and
- Appropriate submittals are provided.

The Installer shall certify the installation complies with the requirements of the installation instructions provided by the manufacturer.

A written guarantee shall be furnished that protects the owner against defective workmanship and materials for not less than 3 years, and includes the name the manufacturer of the wind machine.

Acceptability of any associated conservation practices shall be in accordance with the appropriate NRCS Conservation Practice Specification.

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

587 – STRUCTURE FOR WATER CONTROL

OPERATION AND MAINTENANCE

Sponsor/Land user: _____ Date: _____

Address: _____

_____

Location GPS Coordinates Map Datum: _____ E _____ N _____

Quad Sheet Name _____ SEC _____ T _____ R _____

A properly operated and maintained water control structure is an asset to your farm. This structure was designed and installed to safely convey water at condition that will prevent erosion. The estimated life span of this system is at least 20 years. The life of this system can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic operation and maintenance to maintain satisfactory performance. Additional permits may be required to perform this work. Here are some recommendations to help you develop a good operation and maintenance program.

GENERAL RECOMMENDATIONS

- All fences, railings, and/or warning signs shall be maintained to provide warning and/or prevent unauthorized human or livestock entry.
- Maintain vigorous growth of desirable vegetative coverings. This includes reseeding, fertilization, and controlled application of herbicides when necessary. Periodic mowing may also be needed to control height.
- Remove any debris that may accumulate on or in the immediate area of the structure.
- Make sure that all structural drains are functional.
- Determine and eliminate causes of settlement or cracks in the earthen sections and repair damage.
- Repair spalls, cracks and weathered areas in concrete surfaces.
- Repair or replace rusted or damaged metal and apply paint as a protective coating.
- Check all valves, gates and other appurtenances for proper functioning. If worn or damaged, repair or replace following the manufacturer's recommendations.
- Replace weathered or displaced rock riprap to constructed grade.
- Check all timber or lumber sections for decay and other damage, especially sections in contact with earth or other materials. Repair damaged sections and apply protective coatings as needed.

- Inspect for damage from rodents or burrowing animals. Repair any damage. Take appropriate corrective actions to alleviate further damage.
- Immediately repair any vandalism, vehicular, or livestock damage to any earthfills, spillways, or outlets or other apparatuses.

SPECIFIC RECOMMENDATIONS FOR YOUR STRUCTURE

CONTACT YOUR LOCAL NATURAL RESOURCES CONSERVATION SERVICE OFFICE FOR ANY ADDITIONAL TECHNICAL ASSISTANCE YOU MIGHT NEED FOR IMPLEMENTATION OF THIS OPERATION AND MAINTENANCE PLAN FOR YOUR STRUCTURE FOR WATER CONTROL.

U.S DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
CALIFORNIA

PRACTICE REQUIREMENTS
for
587 - STRUCTURE FOR WATER CONTROL

For: Business Name_____

Job Location_____

County_____ RCD_____ Farm/Tract No._____

Referral No._____Prepared By_____ Date_____

IT SHALL BE THE RESPONSIBILITY OF THE OWNER TO OBTAIN ALL NECESSARY PERMITS AND/OR RIGHTS, AND TO COMPLY WITH ALL ORDINANCES AND LAWS PERTAINING TO THIS INSTALLATION.

Installation shall be in accordance with the following drawings, specifications and special requirements. NO CHANGES ARE TO BE MADE IN THE DRAWINGS OR SPECIFICATIONS WITHOUT PRIOR APPROVAL OF THE NRCS TECHNICIAN.

1. Drawings, No._____ _____ _____

2. Practice Specifications_____587____,_____,_____

3. Special Requirements:_____

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4. Special Maintenance Requirements:_____

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_____

PRACTICE APPROVAL:

Job Classification: (Ref: Section 501 NEM)

Show the limiting elements for this job. This job is classified as, Class _____

Limiting elements:	Units
_____	_____
_____	_____
_____	_____
_____	_____

Design Approved by:_____ Date:_____

LANDOWNER'S/OPERATOR'S ACKNOWLEDGEMENT:

The landowner/operator acknowledges that:

a. He/she has received a copy of the drawings and specification, and that he/she has an understanding of the contents, and the requirements.

b. He/she has obtained all the necessary permits.

c. No changes will be made in the installation of the job without prior concurrence of the NRCS technician.

d. Maintenance of the installed work is necessary for proper performance during the project life.

Accepted by:_____ Date:_____

PRACTICE COMPLETION:

I have made an on site inspection of the site (or I am accepting owner/contractor documentation), and have determined that the job as installed does conform to the drawings and practice specifications.

Completion Certification by:

/s/_____ Date: _____

STATEMENT OF WORK
Structure for Water Control (587)

These deliverables apply to this individual practice. For other planned practice deliverables refer to those specific Statements of Work.

DESIGN

Deliverables:

1. Design documents that demonstrate criteria in practice standard have been met and are compatible with planned and applied practices
    a. Practice purpose(s) as identified in the conservation plan.
    b. List of required permits to be obtained by the client
    c. Compliance with NRCS national and state utility safety policy (NEM part 503-Safety, Section 503.00 through 503.22)
    d. Practice standard criteria related computations and analyses to develop plans and specifications including but not limited to:
        i. Geology and Soil Mechanics (NEM Subpart 531a)
        ii. Hydrology/Hydraulics
        iii. Structural including hazard class as appropriate
        iv. Vegetation
2. Written plans and specifications including sketches and drawings shall be provided to the client that adequately describes the requirements to install the practice and obtain necessary permits.
3. Design Report and Inspection Plan as appropriate (NEM Part 511, Subpart B Documentation, 511.11 and Part 512, Subpart D Quality Assurance Activities, 512.30 through 512.32).
4. Operation and maintenance plan
5. Certification that the design meets practice standard criteria and comply with applicable laws and regulations (NEM Subpart A, 505.03(b)(2))
6. Design modifications during installation as required

INSTALLATION

Deliverables

1. Pre-installation conference with client and contractor
2. Verification that client has obtained required permits
3. Staking and layout according to plans and specifications including applicable layout notes
4. Installation inspection
    a. Actual materials used
    b. Inspection records
5. Facilitate and implement required design modifications with client and original designer
6. Advise client/NRCS on compliance issues with all federal, state, tribal, and local laws, regulations and NRCS policies during installation
7. Certification that the installation process and materials meets design and permit requirements

CHECK OUT

Deliverables

1. As-built documentation
    a. Extent of practice units applied
    b. Drawings
    c. Final quantities
2. Certification that the installation meets NRCS standards and specifications and is in compliance with permits (NEM Subpart A, 505.03(c)(1))
3. Progress reporting

STATEMENT OF WORK
Structure for Water Control (587)

REFERENCES

- Field Office Technical Guide (eFOTG), Section IV, Conservation Practice Standard, Structure for Water Control, 587.
- National Engineering Manual
- NRCS National Environmental Compliance Handbook
- NRCS Cultural Resources Handbook

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

STRUCTURE FOR WATER CONTROL

(No.)
CODE 587

DEFINITION

A structure in a water management system that conveys water, controls the direction or rate of flow, maintains a desired water surface elevation or measures water.

PURPOSE

The practice may be applied as a management component to control the stage, discharge, distribution, delivery or direction of water flow.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies wherever a permanent structure is needed as an integral part of a water-control system to serve one or more of the following functions:

- Convey water from one elevation to a lower elevation within, to or from a water conveyance system such as a ditch, channel, canal or pipeline designed to operate under open channel conditions. Typical structures: drops, chutes, turnouts, surface water inlets, head gates, pump boxes and stilling basins.
- Control the elevation of water in drainage or irrigation ditches. Typical structures: checks, flashboard risers and check dams.
- Control the division or measurement of irrigation water. Typical structures: division boxes and water measurement devices.
- Keep trash, debris or weed seeds from entering pipelines. Typical structure: debris screen and fish screen.
- Control the direction of channel flow resulting from tides and high water or back-flow from flooding. Typical structures: tide and water management gates.
- Control the water table level, remove surface or subsurface water from adjoining land, flood land for frost protection or manage water levels for wildlife or recreation. Typical structures: water level control structures, flashboard risers, pipe drop inlets and box inlets.
- Convey water over, under or along a ditch, canal, road, railroad or other barriers. Typical structures: bridges, culverts, flumes, inverted siphons and long span pipes.
- Modify water flow to provide habitat for fish, wildlife and other aquatic animals. Typical structures: chutes, cold water release structures and flashboard risers.
- Provide silt management in ditches or canals. Typical structure: sluice.
- Supplement a resource management system on land where organic waste or commercial fertilizer is applied.
- Create, restore or enhance wetland hydrology.

CRITERIA

General Criteria Applicable to All Purposes

If soil and climatic conditions permit, a protective cover of vegetation shall be established on all disturbed earth surfaces. If soil or climatic conditions preclude the use of vegetation and protection is needed, non-vegetative means, such as mulches or gravel, may be used. In some places, temporary vegetation may be used until permanent vegetation can be established. Seedbed preparation, weeding, fertilizing, and mulching shall comply with the instructions in technical guides.

Fencing can be provided, if necessary, to protect the vegetation.

Structures shall not be installed that have an adverse effect on septic filter fields.

The water level upstream of water control structures shall not be raised on adjacent properties without permission from the adjacent landowner.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard contact your Natural Resources Conservation Service State Office, or download it from the electronic Field Office Technical Guide for your state.

Provide design features to facilitate continuation of fish migrations, where appropriate.

Additional Criteria for Fish Screens

Fish screens shall be designed on an individual job basis to meet site conditions and functional requirements. Fish screen designs must meet the requirements of the current version of the State of California, Fish Screening Criteria and the National Marine Fisheries Service, Southwest Region, Fish Screening Criteria for Anadromous Salmonids.

Provisions of gravity flow fish screens will include return of the fish to the point of diversion in a manner which insures their survival. Provisions for fish trapping need to be considered and incorporated into the design if necessary.

Fish screens should be designed for easy removal from the river for ease of operations and maintenance.

Fish screen designs shall include a pump safety shutoff mechanism, or bypass, with instrumentation to determine the status of the system.

Water backwash systems should incorporate appropriate water filtration devices.

CONSIDERATIONS

When planning, designing, and installing this practice, the following items should be considered:

Water Quantity

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.
2. Potential for a change in the rate of plant growth and transpiration because of changes in the volume of soil water.
3. Effects on downstream flows or aquifers that would affect other water uses or users.
4. Effects on the volume of downstream flow that might cause environmental, social or economic effects.
5. The effect on the water table of the field to ensure that it will provide a suitable rooting depth for the anticipated crop.
6. Potential use for irrigation management to conserve water.

Water Quality

1. Effects on stream system channel morphology and stability as it relates to erosion and the movement of sediment, solutes, and sediment-attached substances carried by runoff
2. Effects on the movement of dissolved substances below the root zone and to ground water.
3. Effects of field water table on salt content in the root zone.
4. Effects on the turbidity of downstream water resources.
5. Short term and construction-related effects of this practice on the quality of downstream water.
6. Effects of water level control on the temperatures of downstream waters for their effects on aquatic and wildlife communities.
7. Effects on wetlands or water-related wildlife habitats.
8. Effects on the visual quality of downstream water resources.

Design alternatives presented to the client should address economics, ecological concerns, and acceptable level of risk for design criteria as it relates to hazards to life or property.

Cultural Resources Considerations

NRCS's objective is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice will have any effect on any cultural resources.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

GM 420, Part 401, the California Environmental Handbook and the California Environmental Assessment Worksheet provide guidance on how the NRCS must account for cultural resources. The Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Endangered Species Considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Some species are year-round residents in some streams, such as, freshwater shrimp. Other species, such as steelhead and salmon, utilize streams during various seasons. Be aware that during critical periods, such as spawning, eggs in gravel's and rearing of young may preclude activities in the stream that may directly affect the stream habitat during those periods. For example there should be no disturbance of stream gravel beds that may have eggs in them. That could include any equipment in the stream or even walking in the stream or work upstream that may result in sediment depositing in the gravel beds. Document any special considerations for endangered species in the Practice Requirements Worksheet.

PLANS AND SPECIFICATIONS

Plans and specifications for installing structures for water control shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

The plan shall specify the location, grades, quantities, dimensions, materials, and hydraulic and structural requirements for the individual structure.

OPERATION AND MAINTENANCE

An operation and management plan shall be provided to and reviewed with the land manager. The plan shall be site specific and include but not be limited to the following:

- Structures will be checked and necessary maintenance, including removal of debris, shall be performed after major storms and at least semi-annually.
- Water level management and timing shall be adequately described wherever applicable.

REFERENCES

1. California Department of Fish and Game, June 19, 2000, Fish Screen Criteria, http://iep.water.ca.gov/cvffrt/DFGCriteria2.htm
2. National Marine Fisheries Service, January 1997, Fish Screening Criteria for Anadromous Salmonids, http://swr.nmfs.noaa.gov/hcd/fishscrn.pdf
3. National Marine Fisheries Service, May 9, 1996, Addendum to Fish Screening Criteria for Pumped Water Intakes. http://swr.nmfs.noaa.gov/hcd/pumpcrit.pdf
4. California NRCS, September 2003, Technical Notice TN-Engineering-CA-14, NRCS California, Planning and Design Guide for Stream Corridor Restoration

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

WETLAND ENHANCEMENT
(Ac.)
CODE 659

DEFINITION

The rehabilitation or re-establishment of a degraded wetland, and/or the modification of an existing wetland, which augments specific site conditions for specific species or purposes; possibly at the expense of other functions and other species.

PURPOSE

To provide specific wetland conditions to favor specific wetland functions and targeted species by:

- Hydrologic enhancement (depth duration and season of inundation, and/or duration and season of soil saturation).
- Vegetative enhancement (including the removal of undesired species, and/or seeding or planting of desired species).

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on any degraded or non-degraded existing wetland where the objective is specifically to enhance selected wetland functions.

This practice does not apply to the following where the intention is to:

- Treat point and non-point sources of water pollution (Constructed Wetland 656);
- Rehabilitate a degraded wetland where the soils, hydrology, vegetative community, and biological habitat are returned to original conditions (Wetland Restoration 657);
- Create a wetland on a site that historically was not a wetland (Wetland Creation 658).

CRITERIA

General Criteria Applicable to All Purposes

The purpose, goals, and objectives of the enhancement shall be clearly outlined, including the soils, hydrology, and vegetation criteria that are to be met and are appropriate for the site and the project purposes.

The impact of this practice on existing non-degraded wetland functions and/or values will be evaluated.

The soils, hydrology, and vegetative characteristics existing on the site and the contributing watershed shall be documented before enhancement of the site begins.

Soils investigations are necessary to ensure that earthwork excavations do not exceed impermeable soil textures which may be necessary to maintain surface hydrology.

Where known nutrient and pesticide contamination exists, species selected will be tolerant of these conditions.

Sites containing hazardous material shall be cleaned prior to the establishment of this practice. Appropriate actions to clean sites suspected of containing hazardous wastes shall be based on soil tests.

Invasive species, federal/state listed noxious plant species, and nuisance species (e.g., those whose presence or overpopulation jeopardize the practice) shall be controlled on the site. The establishment and/or use of non-native plant species shall be discouraged.

Any use of fertilizers, mechanical treatments, prescribed burning, pesticides, and other chemicals shall assure that the intended purpose of the wetland enhancement shall not be compromised.

Criteria for Hydrologic Enhancement

The hydrology of the site (defined as the rate and timing of inflow and outflow, source, duration, frequency, and depth of flooding, ponding, or saturation) shall meet the project objectives. An adequate source of water must be available to meet hydrology designs.

Timing and level setting of water control structures is required for the establishment of desired

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service State Office or visit the electronic Field Office Technical Guide.

hydrologic conditions for management of vegetation and for optimum wildlife and fish use.

Measures designed and installed to enhance wetlands shall meet NRCS standards and specifications for the particular structure and type of construction.

Existing drainage systems will be utilized, removed, or modified as needed to achieve the intended purpose.

Criteria for Vegetative Enhancement

Establish native hydrophytic vegetation typical for the wetland type(s) being established. Each state will develop specific guidelines that consider soil, seed sources, and species.

Where natural colonization of selected species will dominate within 5 years, natural regeneration can be left to occur.

Adequate substrate material and site preparation necessary for proper establishment of the selected plant species shall be included in the design.

If the targeted hydrophytic vegetation is predominantly herbaceous, several species adapted to the site shall be established. Herbaceous vegetation may be established by a variety of methods including: mechanical or aerial seeding, topsoiling, organic mats, etc., over the entire site or a portion of the site and at densities and depths appropriate.

For forested wetland establishment, where six or more native species are adapted to the site, reforestation shall include at least six species.

Seeding rates shall be based upon percentage of pure live seed within 6 months of planting.

CONSIDERATIONS

Sites containing hazardous materials should be evaluated for the feasibility and cost effectiveness of clean-up and remedial actions.

Water control structures are often necessary to control and manage inflow, outflow and drainage from a wetland. Controlling the outflow from a wetland may involve capacity to store and release stormwater, regulate pool elevation and possibly allow for total drawdown of the wetland for management purposes.

Consider manipulation of water levels to control unwanted vegetation.

Consider existing wetland functions and/or values that may be adversely impacted.

Consider effect enhancement will have on disease vectors such as mosquitoes. It is important to include water management capabilities into the restoration plan, especially when restoring flooding hydrology. Refer to the Central Valley Joint Venture publication “Technical Guide to Best Management Practices for Mosquito Control in Managed Wetlands”, June 2004 for design and management guidelines recommended for controlling mosquitoes.

The inclusion of microtopography can achieve changes in depth and duration of flooding without changing extent of surface area.

Consider effect of volumes and rates of runoff, infiltration, evaporation, and transpiration on the water budget.

Consider effects on downstream flows or aquifers that would affect other water uses or users.

Consider effects on fish and wildlife habitats that would be associated with the practice.

Consider linking wetlands by corridors wherever appropriate to enhance the wetland’s use and colonization by the flora and fauna. Restoration objectives should address the habitat needs of both game and non-game species, including reptiles, amphibians, grassland birds, shorebirds and any special status species that may benefit. Reference the California Natural Diversity Database (CNDDB) for information on species occurrences within 3-5 miles of the planned restoration.

Establishing vegetative buffers on surrounding uplands can reduce sediment and soluble and sediment-attached contaminant delivery by runoff and/or wind.

Consider effects on temperature of water resources to prevent undesired effects on aquatic and wildlife communities.

Soil disturbance associated with the installation of this practice may increase the potential for invasion by unwanted species.

On sites where woody vegetation will dominate, consider adding 1 to 2 dead snags, tree trunks, or logs per acre to provide structure and cover for wildlife and a carbon source for food chain support.

For discharge wetlands, consider underground upslope water and/or groundwater source availability.

When determining which species to plant, consider microtopography and the different hydrology levels.

Consider the effects that location, installation, and management may have on subsurface cultural resources.

Consider the effect of water control structures on the ability of fish to move in and out of the wetland.

Consider the effects that water level draw drowns will have on the mortality of aquatic species such as turtles.

Consider timing of water control to mimic the natural hydrological regime of the area, further enhancing the habitat for aquatic species.

Consider design modifications that will limit potential negative impacts of wetland plants and animals on the project.

Cultural Resources Considerations

NRCS policy is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice or associated practices in the plan could have an effect on cultural resources. The National Historic Preservation Act may require consultation with the California State Historic Preservation Officer.

http://www.nrcs.usda.gov/technical/cultural.html is the primary website for cultural resources information. The California Environmental Handbook and the California Environmental Assessment Worksheet also provide guidance on how the NRCS must account for cultural resources. The e-Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

Endangered Species Considerations

If during the Environmental Assessment NRCS determines that installation of this practice, along with any others proposed, will have an effect on any federal or state listed Rare, Threatened or Endangered species or their habitat, NRCS will advise the client of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the client selects one of the alternative conservation treatments for installation; or with concurrence of the client, NRCS initiates consultations concerning the listed species with the U.S. Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game.

PLANS AND SPECIFICATIONS

Specifications for this practice shall be prepared for each site. Specifications shall be recorded using approved specifications sheets, job sheets, narrative statements in the conservation plan, or other documentation. Requirements for the operation and maintenance of the practice shall be incorporated into site specifications. Plans and specifications should be reviewed by staff with appropriate training in design and implementation of wetland enhancement.

OPERATION AND MAINTENANCE

The following actions shall be carried out to insure that this practice functions as intended throughout its expected life. These actions include normal repetitive activities in the application and use of the practice (operation), and repair and upkeep of the practice (maintenance).

Biological control of undesirable plant species and pests (e.g., using predator or parasitic species) should be implemented where available and feasible.

Inspection schedule for embankments and structures for damage assessment.

Depth of sediment accumulation to be allowed before removal is required.

Management needed to maintain vegetation, including control of unwanted vegetation.

Haying or grazing shall be used as appropriate to manage vegetation. Minimize disturbance to ground nesting species, especially during the primary nesting season.

REFERENCES

1. Executive Order 13112, Invasive Species, February 3, 1999. Federal Register: vol.64, no.25. Feb. 8, 1999.
2. Hall, C.D. and F.J. Cuthbert. 2000. Impact of a controlled wetland drawdown on Blanding's Turtles in Minnesota. Chelonian Conservation Biology. Vol. 3, No. 4, pp. 643-649.
3. Kingsbury, Bruce and Joanne Gibson. 2002. Habitat Management Guidelines for Reptiles and Amphibians of the Midwest. Partners for Amphibian and Reptile Conservation. Ft. Wayne, IN. 57 pp.
4. Maschhoff, Justin T. and James H. Dooley. 2001. Functional requirements and design parameters for restocking coarse woody features in restored wetlands. ASAE Meeting Presentation. Paper No. 012059.
5. USDA, NRCS, 2003. ECS 190-15: Wetland Restoration, Enhancement, Management & Monitoring. 425 pp.
6. USDA, NRCS. Wetland Restoration, Enhancement, or Creation, Engineering Field Handbook Chapter 13, Part 650, pp. 3, 24, 77, 78
7. Kwasny, D.C.et al., 2004. Technical Guide to Best Management Practices for Mosquito Control in Managed Wetlands, Central Valley Joint Venture. 35p.

U.S DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
CALIFORNIA

PRACTICE REQUIREMENTS
FOR
798 – SEASONAL HIGH TUNNEL SYSTEM FOR CROPS

For: Business Name_____

Job Location_____

County_____ RCD_____ Farm/Tract No._____

Referral No._____Prepared By_____ Date_____

IT SHALL BE THE RESPONSIBILITY OF THE OWNER TO OBTAIN ALL NECESSARY PERMITS AND/OR RIGHTS, AND TO COMPLY WITH ALL ORDINANCES AND LAWS PERTAINING TO THIS INSTALLATION.

Installation shall be in accordance with the following drawings, specifications and special requirements. NO CHANGES ARE TO BE MADE IN THE DRAWINGS OR SPECIFICATIONS WITHOUT PRIOR APPROVAL OF THE NRCS.

1. Drawings, No._____ _____ _____

2. Practice Specifications_____798_____,_____,_____

3. Special Requirements:_____

_____

4. Maintenance: _____

_____

PRACTICE APPROVAL:

All High Tunnel Systems will be constructed using manufacturers kits. Assembly, operations, and maintenance will be in accordance with manufacturer's instructions.

Job Classification:

Approved by:_____ Date:_____

_____

NRCS, CA
May 2010

LANDOWNER'S/OPERATOR'S ACKNOWLEDGEMENT:

The landowner/operator acknowledges that:

a. He/she has received a copy of the drawings and specifications, and that he/she has an understanding of the contents, and the requirements.

b. He/she has obtained all the necessary permits.

c. No changes will be made in the installation of the job without prior concurrence of the NRCS technician.

d. Maintenance of the installed work is necessary for proper performance during the project life.

Accepted by:_____ Date:_____

_____

PRACTICE COMPLETION:

I have made an on site inspection of the site (or I am accepting owner/contractor documentation), and have determined that the job as installed does conform to the drawings and practice specifications.

Completion Certification by:

/s/_____ Date _____

STATEMENT OF WORK
Seasonal High Tunnel System for Crops (798)
California

These deliverables apply to this individual practice. For other planned practice deliverables refer to those specific Statements of Work.

DESIGN

Deliverables:

1. Design documents that demonstrate criteria in NRCS practice standard have been met and are compatible with planned and applied practices.
    a. Practice purpose(s) as identified in the conservation plan
    b. List of required permits to be obtained by the client
    c. Impacts on adjacent properties and structures.
    d. Compliance with NRCS national and state utility safety policy (NEM Part 503-Safety, Subpart A - Engineering Activities Affecting Utilities 503.00 through 503.06).
    e. Practice standard criteria-related computations and analyses to develop plans and specifications including but not limited to:
        i. Location
        ii. Outlet considerations (e.g. Water Quality and Quantity, Surface Drainage, Erosion)
        iii. Construction operations
        iv. Vegetation
        v. Environmental considerations
2. Written plans and specifications including manufacturers material lists, details, sketches, and drawings shall be provided to the client that adequately describes the requirements to install the practice and obtain necessary permits. Plans and specifications shall be developed in accordance with the requirements of conservation practice standard Seasonal High Tunnel System for Crops (Code 798).
3. Operation and Maintenance Plan.
4. Certification that the design meets practice standard criteria and comply with applicable laws and regulations.
5. Design modifications during installation as required.

INSTALLATION

Deliverables

1. Pre Installation conference with client and contractor.
2. Verification that client has obtained required permits.
3. Staking and layout according to plans and specifications including applicable layout notes.
4. Installation inspection (according to inspection plan as appropriate).
    a. Actual materials used.
    b. Inspection records
5. Facilitate and implement required design modifications with client and original designer.
6. Advise client/NRCS on compliance issues with all federal, state, tribal, and local laws, regulations and NRCS policies during installation.
7. Certification that the installation process and materials meets design and permit requirements.

CHECK OUT

Deliverables

1. As-Built documentation.
    a. Extent of practice units applied
    b. Drawings
    c. Final quantities
2. Certification that the installation meets NRCS standards and specifications and is in compliance with permits (NEM Subpart A, 505.03(c) (1)).
3. Progress reporting.

STATEMENT OF WORK
Seasonal High Tunnel System for Crops (798)
California

REFERENCES

- CA-NRCS Field Office Technical Guide (eFOTG), Section IV, Conservation Practice Standard – Seasonal High Tunnel System for Crops, 798
- NRCS National Engineering Manual (NEM)
- NRCS National Environmental Compliance Handbook
- NRCS Cultural Resources Handbook

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

798 - SEASONAL HIGH TUNNEL SYSTEM FOR CROPS

I. SCOPE

The work shall consist of furnishing and installing a seasonal high tunnel for crops (not to include heating or ventilation) in accordance with the manufacturer's recommendation at the location as shown on the drawings.

II. SUBMITTALS

The manufacturer shall provide the following items prior to installation of the seasonal high tunnel:

1. Materials list;
2. Installation instructions including erection sequence;
3. Procedures for:
    a. Removal of cover due to inclement weather;
    b. Proper storage;
    c. Reattachment of the cover the next season;
    d. Operation and Maintenance.

III. SITE PREPARATION (where required)

Clearing and disposal methods shall be in accordance with applicable state and county laws with due regard to the safety of persons and property.

Excess material shall be wasted at locations noted on the drawings or as staked in the field.

IV. INSTALLATION

Installation of the unit shall be done in such a manner that erosion and air water pollution are minimized and held within legal limits. The owner, operator, Contractor or other persons will conduct all work and operations in accordance with proper safety codes for the type of construction being performed with due regard to the safety of all persons and property.

V. ASSOCIATED CONSERVATION PRACTICES (where required)

Installation of associated conservation practices shall be as shown on the drawings, and shall be installed in accordance with the appropriate NRCS Construction Specification.

VI. BASIS OF ACCEPTANCE

The acceptability of the seasonal high tunnel system shall be determined by inspection to check:

- The high tunnel system is installed; and
- Appropriate submittals are provided

The Installer shall certify the installation complies with the requirements of the installation instructions provided by the manufacturer.

Acceptability of any associated conservation practices shall be in accordance with the appropriate NRCS Conservation Practice Specification.

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

SEASONAL HIGH TUNNEL SYSTEM FOR CROPS

(ft^2.)

CODE 798

DEFINITION

A seasonal polyethylene covered structure with no electrical, heating, and/or mechanical ventilation systems that is used to cover crops to extend the growing season in an environmentally safe manner.

PURPOSES

- Improve plant quality
- Improve soil quality
- Reduce nutrient and pesticide transport
- Improve air quality through reduced transportation inputs.
- Reduce energy use through local consumption

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to cropland where extension of growing season is needed due to climate conditions and crops can be grown in the natural soil profile. Permanently raised beds may be installed to improve soil condition, fertility, and agri-ability access, but does not apply to crops not grown in the natural soil profile (i.e. tables/benches, portable pots, etc.).

The practice does not include greenhouses or low tunnel systems that may cover single crop rows.

CRITERIA

General Criteria Applicable to All Purposes

Plan supportive conservation practices to address all environmental concerns associated with the use of tunnel systems.

The seasonal tunnel structure must be planned, designed, and constructed in accordance with manufacturer's recommendation. The tunnel frame must be constructed of metal, wood, or durable plastic, and be at least 6 feet in height.

Seasonal tunnel structures shall be selected and applied over the crop area. The material shall be of a significant thickness to withstand the temperature modification for the period required. As a minimum, a 6-mil greenhouse-grade, UV resistant polyethylene cover will be used.

In climate conditions where snow loads may damage the structure, the tunnel cover shall be removed or rolled up at the end of the growing season unless the structure is designed to withstand expected snow loads.

Runoff shall be directed away from the tunnel structure to avoid ponding. Runoff may be captured and used for irrigation purposes. The minimum design capacity for runoff structures shall be a 10-year storm frequency, 5-minute rainfall precipitation event. Runoff may empty into surface or underground outlets, or onto the ground surface when properly protected. Surface and underground outlets shall be sized to ensure adequate capacity. Provide for clean-out as appropriate. When runoff from tunnel covers empties onto the ground surface, a detention basin, storage reservoir, or stable outlet shall be provided.

Surface or ground outlets such as rock pads, rock filled trenches with subsurface drains,

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service State Office or visit the Field Office Technical Guide.

concrete and other erosion-resistant pads, or preformed channels may be used.

Seeding and vegetation shall be established on all disturbed earth surfaces.

Additional Criteria to Reduce Nutrient and Pesticide Transport

The irrigation water applied under the covered area shall not exceed the available water capacity of the soil to avoid runoff and leaching below the root zone.

Additional Criteria to Improve Soil Quality

The area inside the seasonal structure shall have soil loss within soil tolerance level (T) using currently approved agency wind and water erosion technology.

Additional Criteria to Improve Air Quality and Reduce Energy Consumption

The crops produced for sale and consumption shall be within commuting distances of farmers markets, fruit/produce distribution centers, or other community facilities.

CONSIDERATIONS

Locate the tunnel cover convenient for ingress/egress of plant materials.

Remove or manipulate side covers to control internal temperatures.

Rotate the location of the tunnel to allow rain, wind, sun, and cold temperatures to cleanse the soil from disease build up. Rotation allows growing cover crops on the site during the uncovered period.

Plan the appropriate measures to address:

- crop rotation
- irrigation water management
- nutrient management
- pest management
- runoff from the structure

Have a reliable source of good quality water near or in the tunnel.

Cultural Resources

NRCS policy is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice or associated practices in the plan could have an effect on cultural resources. The National Historic Preservation Act may require consultation with the California State Historic Preservation Officer.

http://www.nrcs.usda.gov/technical/cultural.html is the primary website for cultural resources information. The California Environmental Handbook and the California Environmental Assessment Worksheet also provide guidance on how the NRCS must account for cultural resources. The e-Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

Endangered Species

If during the Environmental Assessment NRCS determines that installation of this practice, along with any others proposed, will have an effect on any federal or state listed Rare, Threatened or Endangered species or their habitat, NRCS will advise the client of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the client selects one of the alternative conservation treatments for installation; or with concurrence of the client, NRCS initiates consultations concerning the listed species with the U.S. Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared in accordance with the criteria of this standard.

As a minimum, the plans and specifications shall provide the following:

- Layout and location of the tunnel cover; erosion control, runoff, and vegetative cover practices.
- Materials list and structural details of the cover, including all necessary appurtenances as appropriate for the complete system.

- Procedure and timing for installing the tunnel cover (construction sequence), erosion control, runoff, and vegetative practices.
- Procedure and timing to remove or roll up the tunnel cover prior to inclement weather conditions.
- Site preparation.

OPERATION AND MAINTENANCE

An operation and maintenance (O&M) plan must be prepared and reviewed with the landowner or operator responsible for the application of the practice. The O&M plan shall provide specific instruction for proper operation and maintenance of each component of this practice and shall detail the level of repairs needed to maintain the effectiveness and useful life of the practice.

Covered area will be periodically inspected, and shall be reinstalled or repaired as needed to accomplish the intended purpose.

Removal of cover materials shall be consistent with the intended purpose and site conditions.

Operation of equipment near and on the site shall not compromise the intended purpose of the cover.

REFERENCES

Community Garden Guide Season Extension - High Tunnel; NRCS http://plant-materials.nrcs.usda.gov/mipmc

Community Garden Guide Season Extension – Hoophouses; NRCS. http://plant-materials.nrcs.usda.gov/mipmc/communitygardens.html

University of Minnesota, http://hightunnels.cfans.umn.edu/resources.htm
Part I: Introduction to High Tunnels; Spaw, M. and William, K. http://www.hightunnels.org/foreducators.htm

High Tunnel Production Manual; Penn State University, College of Agriculture, Department of Horticulture. White, L. and Orzolek, M. 2003 http://www.nasga.org/publications/pubs_hightunnel.htm

High Tunnels; Ted Blomgren of Cornell Cooperative Extension and Tracy Frisch of the Regional Farm and Food Project. http://www.uvm.edu/sustainableagriculture/hightunnels.htm